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Historical Reflections on Religion, Finance and Economic Development

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In this thesis, chapter 3 is co-authored with Alan Fernihough and chapter 4 is co-authored with Christopher L. Colvin and John D. Turner.

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1. Introduction

1.1. Abstract

This thesis investigates the role of religion in historical economic and financial development. Attention is directed to Ireland and the Netherlands, focusing mainly on the 1861–1911 period. Both polities provide an interesting testing ground for religion-related inquiry: Ireland where a Catholic majority ceded economic power to a Protestant minority, and the Netherlands where a process of "pillarisation" divided society into distinct socioeconomic strands by religion and ideology. In the Irish case, evidence is presented that points to an economic convergence between Catholics and Protestants in the post-Famine era in what might be described as a "Catholic embourgeoisement". However, further evidence, presented at the individual level for 1911, suggests a residual human capital gap between Catholics and Protestants, even after controlling for a variety of relevant underlying socioeconomic variables. As such, while Catholics may have closed the gap with Protestants, religion still remained significant for economic variation in Ireland by the turn of the century. This temporal dimension is reemphasised in the Dutch case where Catholicism appears to have been an important catalyst for the emergence of financial cooperatives, but is less relevant for their subsequent performance.

1.2. Motivation

Academic interest in the role of religion in economic development can be traced at least back to Max Weber's (1904/5) seminal thesis: *The Protestant Ethic and the Spirit of Capitalism*. Emerging at the turn of the twentieth century, Weber's ideas were novel, but controversial, and have continued to generate scholarly debate over a century later.

The basic argument made by Weber, and effectively summarised by Rachel McCleary (2011, p. 4), in her recent introduction to the *Oxford Handbook of the Economics of Religion*, is as follows:

> Calvinism and its derivative sects, such as Puritanism, understood salvation to be accomplished by works (productivity). God demanded of each person a lifetime of works that were ordered by morality. The believer's actions in the world originate in God's grace; this faith in turn justifies itself by the moral quality of the action. The quality of the action, Christian conduct, was defined by a rational system of morality and became the standard by which to measure the glory of God. Thus, salvation by work (daily work, not ascetic activities of monastic communities) was organized and rationally justified in an impartial moral system that applied to the activities of one's daily life and logically led to the rational organization of labor.

Weber's critics have been many. Early prominent contributions by Tawney (1926) and Samuelsson (1957) questioned the accuracy of the causal link suggested by Weber, while more recent scholarship by Becker and Woessmann (2009) and Andersen et al. (forthcoming) provides new evidence which similarly suggests divergence from the Weberian narrative. Nevertheless, the fundamental ideas expressed by Weber continue to be particularly appealing as they offer a possible cultural channel to explain variation in economic development, and thus sit alongside other possible "grand" determinants such as institutions, geography, and technology. The importance, then, of the Weberian thesis may be less about the strength of the Protestant-ethic explanation, and more about its impact on generating inquiry into the causal connection between religion (or more broadly culture) and development. Indeed, a burgeoning pool of increasingly nuanced scholarly work provides some support for this claim, with a diversity of perspectives emerging across countries, time,

and religions.

At the international level, cross-country inquiry by Barro and McCleary (2003) finds that religious beliefs in heaven and hell have a positive effect on economic growth, but that church attendance has a negative impact. Similarly, Guiso et al. (2003) find that religious beliefs are associated with favourable economic attitudes, with Christian religions more positively related to attitudes advantageous for economic growth. In addition, work by Arruñada (2010) provides evidence of differences in values between Catholics and Protestants, and suggests Protestantism may be a positive influence on capitalist economic development, not through a particular work ethic, but instead by promoting a different social ethic favourable for impersonal trade. Other studies find more local religious effects by focusing on specific regions. For example, Becker and Woessmann (2009) find that Protestant economic advantage in Prussia can be explained considerably by literacy, while Boppart et al. (2014) find a Protestant lead in a variety of cognitive areas for Switzerland. The recent literature also expands to the economic significance of other world religions. For example, various scholars have highlighted the particular economic achievement of Jews (Botticini and Eckstein, 2007; Chiswick, 2009), and other inquiry has provided new insights on Islam, such as Chaney (2016) who highlights a reversal in Islamic scientific output, and Campante and Yanagizawa-Drott (2015) who point to a negative relationship between the length of Ramadan fasting and economic growth in Muslim countries. There has also been greater effort exerted by recent scholars to delineate the causal channel through which religion may affect development, with a variety of possible pathways suggested, such as trust (La Porta et al., 1997), human capital (Becker and Woessmann, 2009), democracy (Woodberry, 2012), and knowledge diffusion (Bai and Kung, 2015). Of course, as highlighted by recent research, care must

be taken when generalising the role of religion across time and space, with other factors potentially relevant for the effect of religion, such as political attitudes (Boppart et al., 2013), the power of religious elites (Chaudhary and Rubin, 2011), and religiosity (Barro and McCleary, 2003).

A recent review paper by Becker et al. (2016) assesses the current status of research pertaining to the 'causes and consequences of the Protestant Reformation', with the latter focus on the particular consequences of Protestantism aligning especially well with the present thesis. Surveying the literature, Becker et al. (2016) first point to evidence of an alternative human capital mechanism through which Protestantism may have been conducive to economic development, differing from Weber's ethic explanation. Indeed, Becker and Woessmann's (2009) recent work has provided a particularly persuasive alternative human capital interpretation for nineteenth-century Prussia, where they suggest a Protestant emphasis on Bible-reading encouraged greater literacy and can explain much of the economic advantage associated with Protestantism. However, Becker et al. (2016) go on in their review to suggest that the Weberian work ethic is not fully repudiated in the existing literature, pointing to other evidence which gives some support to the basic premise that Protestants might work harder. Further focus by Becker et al. (2016) on the general association between Protestantism and economic development also yields mixed conclusions, with cases presented which find a favourable Protestant association, and others where Protestantism is less relevant. As such, both the measurement and geographical focus of the study may have particular relevance for whether a positive Protestant relationship is found. In addition, Becker et al. (2016) also highlight the potentially important legal and political implications of the Reformation, as well as its possible significance for "darker" outcomes such as suicide.

A further recent survey paper by Iyer (2016) provides a useful overview of the current status of a wider "economics of religion" literature. Commenting on the scope of this research body, Iyer (2016) writes, 'the economics of religion is research that uses the tools and methods of economics to study religion as a dependent variable or to study religion as an independent variable on other socio-economic outcomes'. Similar to scholarly work focusing specifically on Protestantism, her review highlights a substantial growth of this broader literature in recent years, with developments such as advances in the use theoretical models, empirical improvements in causal identification, new scholarship concerning the economic history of religion with religion as an independent variable, and greater attention beyond the West.

This thesis augments the aforementioned research body by providing three country-specific analyses which address particular gaps in the literature. The first considers the case of Ireland, where analysis of the role of religion in economic development has been largely overlooked, despite its Catholic-Protestant dichotomy, and unresolved early debate about the relationship between religion and development. The second continues the Irish focus, but considers specifically the effect of religion on human capital, and in particular deals with the lack of statistical perspective at the individual level in related studies. The final analysis provides perspective on the Netherlands, and specifically on the role of religion in shaping financial development, especially its implications for the emergence of financial cooperatives.

1.3. Overview of Thesis and Findings

The main body of this thesis is organised into three chapters. The first, chapter 2, is entitled 'Religion and Development in Post-Famine Ireland', the second, chapter 3, is entitled 'Human Capital and Protestantism: Micro Evidence from Early Twentieth-

Century Ireland', and the third, chapter 4, is entitled 'An Economic Conversion? Rural Cooperative Banking in the Netherlands at the Turn of the Twentieth Century'. Chapter 3 is co-authored with Alan Fernihough, and chapter 4 is co-authored with Chris Colvin and John Turner. An overview of each of these chapters is now provided.

1.3.1. Synopsis of Chapter 2

Max Weber, with the publication of his seminal work *The Protestant Ethic and the Spirit of Capitalism* (1904/5), is often credited with catalysing a literature examining the association between religion and economic growth. Yet, about the same time as Weber's thesis emerged, former Unionist politician and Irish cooperative pioneer Horace Plunkett (1905) initiated a related debate on the relevance of religion in Irish development. Like Weber, Plunkett (1905, pp. 101–102) viewed Catholicism as inferior to Protestantism in development terms, citing its deficient economic traits and lesser industrial tendencies. However, unlike the Weberian thesis, which motivated a century of scholarship, debate on the Irish case seems to have waned in the ensuing decades, possibly due to sensitivities surrounding the religion question.

Reopening that debate, I focus on the relationship between Catholicism and a variety of economic and financial development indicators in Ireland for the post-Famine era. This period is particularly interesting as it provides a window to not only think about the relationship between religion and development, but to consider also why this relationship may change over time, especially with respect to Catholicism. This is because with the (i) disproportionate impact of the Famine on the Catholic population, (ii) a shift in societal power towards Catholics through Emancipation, education, and politics, and (iii) a new rational regulation of the family aided by the Catholic Church, post-Famine Catholicism arguably embarked on what might be

described as an "embourgeoisement", as typified by an upward socioeconomic transition towards a more middle-class, and arguably more "Protestant-like", people in the post-Famine era.

From the analysis, Catholicism emerges in a positive light—yes lagging initially in development terms (or starting from a lower base), but generally closing the gap with Protestantism over time. Indeed, in all development areas investigated—education, occupations, and business and finance—there has been evidence of the diminishing importance of religion, suggesting Catholics converged economically with their Protestant counterparts in the post-Famine decades. This favourable trajectory shown by Catholicism complements historical evidence on a "Catholic embourgeoisement" in the post-Famine era and the increasing "anglicisation" of society at large. At its root, lies the gradual erosion of differences which distinguished Catholics and Protestants in economic terms: (i) *legal differences* with the removal of the penal laws and Catholic Emancipation, (ii) *human capital differences* with the arrival of the National System of Education and rising literacy, and (iii) *cultural differences* with the decline of the Irish language and peasant religion. Of course, also closely linked to this improving Catholic situation is the sudden demographic adjustment yielded by the Famine, which led to an abrupt improvement in the economic position of the average Catholic, and a reorganisation of Catholic society.

1.3.2. Synopsis of Chapter 3

Recent scholarship by Becker and Woessmann (2009, 2010) challenges the Weberian interpretation of Protestant economic history, suggesting that Protestants prospered not because the Reformation marked a psychological watershed as Weber advocated, but instead due to a new emphasis on reading the Bible for oneself. This, they argue,

promoted human capital gains, with the resultant literacy difference explaining almost the entire gap in economic outcomes between the Christian denominations. Yet, more recently, Boppart et al. (2014) raise the possibility that Protestant motivation went beyond the acquisition of reading skills, and show that Protestants led in a variety of cognitive areas in their analysis which uses the results of pedagogical examinations from late nineteenth-century Switzerland. Indeed, while their study reveals a specific Protestant motivation to accrue reading ability, the authors emphasise wider Protestant investment in other education areas in line with the broader educational goals of the main reformers.

We contribute to this wider debate by using a large sample of individual-level data from the full population census of Ireland in 1911 to estimate the relationship between Protestantism and human capital. By using individual-level data we differ from previous studies where aggregate-level data has generally been used, and are thus able to deal with concerns about the ecological fallacy problem, wherein the inference of aggregate-level data may be inconsistent with patterns observed at the individual level. In addition, our analysis offers at least three other advantages in augmenting the existing literature. Firstly, we are able to use literacy and age heaping as alternative human capital indicators, and therefore provide a more nuanced perspective of human capital acquisition. Secondly, we are able to provide coverage for a significant portion of the population, and so mitigate biases connected with small population samples and alternative sources to the census. And thirdly, since the individual returns from the 1911 Irish census contain a wealth of demographic and geographic information, we are able to precisely distinguish the effect of religion from other potential causal pathways.

Our results reveal a sizeable human capital gap between Catholics and Protestants when either age heaping or literacy is used as the human capital measure. This difference is robust to the inclusion of a variety of potentially important offsetting factors. We also find a literacy gap between the main Protestant denominations (i.e. the Church of Ireland and Presbyterianism), although this does not extend to age heaping. As such, our results point to the significance of religious and broader cultural factors for variation in human capital in Ireland until at least the turn of the twentieth century.

1.3.3. Synopsis of Chapter 4

Rural Raiffeisen banks entered the market for household finance in the Netherlands at the turn of the twentieth century, at a time when a variety of other formal incumbents already existed. These new entrants were novel in many respects, especially in their unique cooperative organisational form and in their dual emphasis on savings and loans. Yet, the precise role they fulfilled, and the exact reasons for their existence, are still not fully understood.

We address this functional puzzle in a quantitative framework that is motivated by three hypotheses which have been advanced in various parts of the existing literature, to explain the timing of their entry: (1) to meet untapped market demand for financial services from the unbanked and underbanked; (2) as an organisational response to agricultural depression and technological change; and (3) as a means of extending and consolidating the influence of confessional, pillarised, sociopolitical organisations across Dutch society. By considering these alternative explanations, we aim to deduce the factors that precipitated entry, and to understand whether those factors influenced subsequent performance.

To test these hypotheses, we a compile a dataset using information collated in annual reports produced by the Netherlands' Centraal Bureau voor de Statistiek and supplement this with demographic and land-type data from other sources. We direct our attention to the years 1898, 1904, and 1909, as over this horizon the early entry of Raiffeisen banks occurs. Our empirical approach takes two stages. First, we address the factors which precipitated the entry of Raiffeisen banks. We begin by using bank age as a dependent variable to ascertain the conditions most critical to the entry of the first Raiffeisen banks. Following this, we employ the presence in an area, in 1904, of a Raiffeisen bank, and then the presence of a Raiffeisen bank which entered between 1905 and 1909, as dependent variables. This perspective differs from the bank age approach in that it adopts a municipality-level viewpoint as opposed to a bank-level perspective, and thus likely reflects the initial catalyst(s) less acutely, but instead helps to reveal whether the early drivers of entry remained important over time. Subsequently, we test whether the factors that induced entry are similar to those which drive post-entry performance.

Overall, our results suggest that the existence of Raiffeisen banks, in the Dutch context at least, should be understood as a response to both social and economic demands. Yes, a sustained period of agricultural crisis in the late-nineteenth century and an absence of (appropriate) incumbent financiers may have provided an economic rationale for their existence, but it seems unlikely to have been a sufficient precondition. Rather, the Catholic Church, by taking advantage of its religious network, could provide the necessary impetus for the initial diffusion phase. Then, once the banks had been established, the organisational model of Raiffeisen banks was able to benefit from efficiencies accrued from religion-related social collegiality (Colvin and McLaughlin, 2014), perhaps with the function of religion ultimately

transitioning from philanthropy to economy.

1.4. Contribution to the Existing Literature

Chapters 2 and 3 of this thesis provide a new quantitative perspective on the relationship between religion and development in Ireland for the post-Famine era. Research in this area is distinctly lacking despite the emergence of Horace Plunkett's (1905) controversial work over a century ago, perhaps due to specific sensitives surrounding the issue of religion in Ireland. The new statistical evidence presented in chapter 2 provides a nuanced perspective on the association between Catholicism and development in a variety of areas, adding to scholarship by others whose work relates to the economic significance of religion in Ireland such as Walsh (1968, 1970),[1] Kennedy (1978), Akenson (1988), O'Rourke (2007), and Ó Gráda (2008a). The revealed patterns of denominational convergence provide a previously lacking quantification of the improving Catholic position in the post-Famine era, and speak more broadly about the time and space considerations necessary when considering the relationship between religion and development. Furthermore, the focus on Catholicism differs from the wider economics literature, where scholarship has tended to take a particularly Protestant perspective (Becker and Woessmann, 2009; Boppart et al., 2013; Cantoni, 2015).

Chapter 3 adds to the statistical perspective gained in chapter 2 on the role of religion in Irish development, but focuses at the individual level. The latter is

[1] Walsh (1968, 1970), focusing particularly on the mid-twentieth century, points to important demographic differences between Catholics and non-Catholics, such as higher Catholic marital fertility even after considering social grouping. Interestingly, however, as Walsh (1970) mentions, Park's (1962/3) study of Northern Ireland provides some evidence of a possible reversal whereby Catholic fertility was behind other denominations in the latter nineteenth century, but that this gap was eroded and eventually Catholic fertility exceeded that of their counterparts. Moreover, as Walsh (1968) also highlights, larger families may represent an impediment to social mobility, and thus religious differences in fertility represent a possible driver of variation in economic advancement.

especially important as existing inquiry has not adequately considered the problem of making inferences about individuals from aggregate-level data. Indeed, the issue was highlighted in recent scholarship by Brown and Guinnane (2007) and Fernihough (2017). However, with census digitisation and new methods such as scraping becoming more prevalent in recent years, the feasibility of using large individual-level datasets has increased—opening up many new research possibilities in the social sciences. Indeed, papers by Fernihough et al. (2015) and Fernihough (2017) have already benefitted from such data advances and have provided new insights into marriage patterns and the trade-off between child quantity and quality for Ireland. Chapter 3 adds to such work—providing further novel insight using a large dataset. As well as dealing with the lack of individual-level data in existing studies, chapter 3 also adds to recent scholarship which has underlined the role of religion in human capital acquisition (Becker and Woessmann, 2009). In particular, the study highlights the existence of a human capital gap between Irish Catholics and Irish Protestants, which is robust to a variety of alternative specifications and economically sizeable—an important finding in the context of the Irish development question. More generally, chapters 2 and 3 provide an enhanced religious perspective for post-Famine Irish economic history, adding to a rich body of existing scholarship such as Cullen (1981), Daly (1981), Lee (1989), and Ó Gráda (1995).

Finally, chapter 4 provides a new quantitative perspective on the early years of Raiffeisen banking in the Netherlands. In particular, the study addresses statistically some of the main hypotheses emanating from the existing literature for the emergence of the Raiffeisen banks (such as in work by Jonker (1988), Sluyterman et al. (1998), and Bieleman (2008)). The inquiry also provides a new quantitative perspective on the "performance" of the new entrants and incumbents, thereby adding especially to

previous work by Deneweth et al. (2014), who provide a useful outline of the market for savings and loans in the nineteenth century. More generally, the chapter also provides an insight into the fundamental question of why financial institutions exist and what function they fulfil.

Overall, this thesis normally approaches the issue of religion in basic proportional terms. However, it is important to acknowledge that the literature also provides additional, and perhaps complementary, alternative dimensions for considering the subject of religion. For example, in the Irish case, scholarship by O'Neill (2012, 2013) points to the nuanced nature of Catholic society in Ireland and its own elite stratum—underlining the importance of refined appraisal alongside the more "basic" approach taken here. Furthermore, as demonstrated in recent work on France by Squicciarini (2017), religiosity is a pertinent consideration for development beyond focusing solely on affiliation to a particular religion.

2. Religion and Development in Post-Famine Ireland

2.1. Abstract

Over a century ago, Horace Plunkett began a debate about the role of religion in Irish development pointing to what he saw as the economic shortcomings of Roman Catholicism. Thereafter, however, the debate waned, and limited scholarship has subsequently investigated the significance of religion in Irish development, especially in statistical terms. In this chapter that lacuna is addressed, with a quantitative approach taken to examine the relationship between Catholicism and economic and financial development for the post-Famine era. Attention is directed to a variety of development indicators, namely, education, occupations, and business and finance. By focusing on a selection of measures over time, it is possible to determine more precisely where differences, if any, occurred between the denominations, and also to ascertain whether such differences changed over the period. The analysis reveals that Catholicism tends to be initially negatively associated with more advanced development outcomes, but that this association ameliorates over time. As such, the results point to an economic convergence between Catholics and Protestants, complementing historical evidence on an upward Catholic socioeconomic transition —a "Catholic embourgeoisement"—in the post-Famine era.

2.2. Introduction

'Roman Catholicism strikes an outsider as being in some of its tendencies non-economic, if not actually anti-economic' (Horace Plunkett, 1905, p. 101)

Max Weber, with the publication of his seminal work *The Protestant Ethic and the Spirit of Capitalism* (1904/5), is often credited with catalysing a literature examining the association between religion and economic growth. Yet, about the same time as Weber's thesis emerged, former Unionist politician and Irish cooperative pioneer Horace Plunkett (1905) initiated a related debate on the relevance of religion in Irish development.[2] Like Weber, Plunkett (1905, pp. 101–102) viewed Catholicism as inferior to Protestantism in development terms, citing its deficient economic traits and lesser industrial tendencies.[3] However, unlike the Weberian thesis, which motivated a century of scholarship, debate on the Irish case seems to have waned in the ensuing decades due to sensitivities surrounding the religion question.[4] In this chapter, that debate is reopened, and focus is directed to the relationship between Catholicism and a variety of economic and financial development indicators for the post-Famine era. This period is particularly interesting as it provides a window to not only think about the relationship between religion and development, but to also consider why this relationship may change over time, especially with respect to Catholicism. This is because with the (i) disproportionate impact of the Famine on the Catholic population, (ii) a shift in societal power towards Catholics through Emancipation, education, and politics, and (iii) a new rational regulation of the family aided by the Catholic Church, post-Famine Catholicism arguably embarked on what might be described as an "embourgeoisement". Indeed, the patterns of religious convergence revealed in this chapter, contrast with Plunkett's assertions regarding the inimical nature of

[2] Plunkett was born in 1854 into the Anglo-Irish nobility, and became the first Vice-President of the Department of Agriculture and Technical Instruction in 1899 (Jackson, 2007, pp. 470–471).

[3] Where reference is made in the chapter to Catholicism or Catholic, more correctly speaking this is Roman Catholicism or Roman Catholic.

[4] Plunkett (1905) suggested a Catholic impediment to economic growth in Ireland, prompting a comprehensive challenge to this argument by O'Riordan (1906). Yet, that seems to have been the end of the discussion with Fields (2003, p. 4) (citing Akenson, 1991 – this is a later version of the 1988 version cited here in the reference section), noting, 'the remarkable fact was, that the Weber-Tawney debate on the central role of religion as the fulcrum in indigenous Irish culture and economic life had started and finished in 1905 due to the sensitivity of the topic area'.

Catholicism in economic advancement, and instead fit more closely with the notion of a "Catholic embourgeoisement", as typified by an upward socioeconomic transition towards a more middle-class, and arguably more "Protestant-like", people in the post-Famine era.

Central to this alternative narrative, and as emphasised in the work of Akenson (1988), is the distinction between correlation and causation in the Irish case. For while Ireland, with its Catholic-Protestant cultural dichotomy, provides an ideal empirical setting for examining religion as a determinant of growth, the clustering of religious groups in particular regions can lead to a "guilt by association" trap. As such, there is a risk that religion is erroneously linked with development outcomes without adequately accounting for underlying geography-related differences.[5] In addition, the Catholic-development relationship needs to be seen in light of historical inequality. This is because Catholics were generally overrepresented in the lower strata of society, and were constrained in their ability to advance economically with discrimination from influences such as the penal laws (O'Riordan, 1906).[6] Hence, Catholic disadvantage, as evidenced in the micro-level analyses of Ó Gráda (2008a), and Ó Gráda and McCabe (2010), does not necessarily equate to economic backwardness, and instead may be related to historical factors which Plunkett (1905, pp. 104–105) himself acknowledges, including educational deprivation, property restrictions, and social and political exclusion.

Consistent with such thinking, when the development trajectory of Catholicism in the post-Famine era is more carefully appraised, its transition through time appears

[5] This is conceptually similar to the ecological fallacy, the problem where the inference of aggregate data is not consistent with that which is observed at the individual level. When mentioning 'geography-related differences' this is referring to differences between different areas such as living standards.

[6] For further perspective see Power and Whelan (1990), and Connolly (1992).

favourable. For example, Akenson (1988) downplays the idea that there was a causal cultural mechanism leading to differences in Catholic and Protestant behaviour in his study focusing on the Irish and the Irish diaspora, and instead suggests that differences between Catholics and Protestants were small. Similarly, O'Rourke (2007) downplays the role of religious variation in his analysis of Irish creameries and their propensity to form cooperatives, finding it was conflict, and a related lack of cultural homogeneity, that were inhibitive to cooperation in the Catholic-concentrated South as opposed to Catholicism per se. Moreover, Kennedy (1978) suggests that the specific role of the Catholic Church in nineteenth-century development was a positive one, contrasting with Plunkett's grievances about the Church's role in Catholic backwardness. Indeed, the post-Famine Catholic experience might have been more correctly described as an "embourgeoisement", with Miller (1985, p. 124; 2008, pp. 89–90) pointing to the Church, Irish nationalism, and strong farming families as being important factors in this respect; the Church through its influence in education and religion, nationalism through political consciousness, and strong farming families by promoting practices such as impartible inheritance and the dowry.

To consider the plausibility of this alternative narrative, a quantitative methodology is adopted to analyse the association between Catholicism and a variety of economic and financial development indicators for the post-Famine period. This method is motivated by a recent literature that advocates a variety of alternative development pathways through which Catholic-Protestant differences may manifest, such as human capital (Becker and Woessmann, 2009), trust (La Porta et al., 1997; Inglehart, 1999),[7] social values (Guiso et al., 2003; Arruñada, 2010), and finance (Stulz and Williamson, 2003; Hilary and Hui, 2009; Kumar et al., 2011; Renneboog and

[7] The hierarchical nature of Catholicism may be inhibitive in this respect (Putnam, 1993).

Spaenjers, 2012). The approach provides at least four advantages. Firstly, by looking at the association between Catholicism and development over time, a view of any changes in the relationship is obtained, allowing the transition to be observed in light of historical disadvantage and discrimination. Secondly, by focusing on a variety of development areas, namely, education, occupations, and business and finance, the specific development channels through which any religious "effect" flows can be more precisely delineated. Thirdly, where econometric models are used, the specific effect of religion on development can be more accurately distinguished from other factors. And finally, where individual-level data linking religious affiliation with development characteristics are employed, concerns relating to the pitfalls of making inferences from aggregate-level data—the ecological fallacy problem—are alleviated. However, despite these advantages, when considering possible religious differences in the Irish case, it should be acknowledged that the Catholic "label" encompasses more than a difference in spiritual ideology and practice. Rather with the historical immigration of Protestants, such variation may reflect broader factors such as culture and entrenched social division. Indeed, the exact reasons for potential development differences between Catholics and Protestants are more fully explored in the sections that follow.

The main finding of the chapter is that development differences between Catholics and Protestants tended to diminish in the post-Famine era. Put simply, Catholics converged with their Protestant counterparts. This fits well with historical evidence on the emergence of a new Catholic middle class via a process of "embourgeoisement" in the post-Famine era, and also points to an amelioration of Catholic disadvantage over time. Indeed, perhaps most striking is the rising human capital status of Catholics, as exemplified by their gains in literacy and occupations. Furthermore, for finance and business there is also evidence of the diminishing

importance of religion over the observation horizon.

2.3. A Catholic Embourgeoisement?

In nineteenth-century Ireland, religion was a powerful predictor of social and economic status. Broadly speaking, the minority Protestant population, who were largely affiliated to the Anglican and Presbyterian Churches, enjoyed a societal standing superior to their majority Catholic counterparts, who were mainly relegated to the lower social strata.[8] Indeed, the literacy returns of the 1861 census—the first to report on religious denomination—provide a useful quantification of this dichotomisation for the early post-Famine years. As shown in figure 2.1, Catholic literacy was just 35 per cent, as compared to in excess of 60 per cent for both Anglicanism and Presbyterianism, with an even greater human capital disparity evident between Catholics and other minor denominations.

This Catholic-Protestant difference is further elaborated in the religious stratification of occupations, where there is an obvious distinction between the Catholic, Anglican, and Presbyterian denominations. As shown in table 2.1 (which focuses on males), Anglicans, as adherents of the Established Church, dominated the highest occupational categories in 1861. Despite making up just 12 per cent of the population, they held at least 50 per cent of positions among landed proprietors, barristers, attorneys, physicians and surgeons, in 'other liberal professions', and the military and naval services, as well as being overrepresented in other advanced professions. By contrast, Catholics were significantly underrepresented in the higher-

[8] According to *Census of Ireland, 1861* (P.P. 1863, LXI), p. xxvii, religious representation in 1861 was as follows: Roman Catholics = 77.69 per cent, Established Church (Anglicans) = 11.96 per cent, Presbyterians = 9.02 per cent, Methodists = 0.79 per cent, Independents = 0.08 per cent, Baptists = 0.07 per cent, Society of Friends or Quakers = 0.06 per cent, all other persuasions = 0.25 per cent, Jews = 0.01 per cent, unspecified = 0.07 per cent.

level occupations, such as in the legal and medical professions, and instead had stronger representation in the farmers/agriculturalists and miscellaneous categories. Somewhere between these two, Presbyterians had a more intermediate status; with relatively high representation in commerce, manufactures, and mechanical trades, and among physicians and surgeons, but more weakly represented in categories such as the legal profession and the civil service.

Although increasingly "statisticalised" from the mid-nineteenth century, the roots of this enduring religious disparity can be traced to the spread of Protestantism in Ireland via plantation from the sixteenth century, and consolidated in the Cromwellian Act of Settlement of 1652, which greatly accelerated the transfer of land from Catholic to Protestant hands. By 1703, Catholic land ownership had dropped to 14 per cent as compared to 59 per cent in 1641 (Moody, 1991, p. l), and would continue falling into the eighteenth century—reaching just 5 per cent by 1776 (Foster, 1988, p. 211).[9] Indeed, despite some improvement in the Catholic situation during the Restoration period (1666–1690), with an easing of religious persecution albeit without the desired land return, ultimately the diminution of the religious majority was complete with the defeat of James II and the triumph of Protestantism under William of Orange at the close of the century (Canny, 1989, p. 149).

Following William's victory, Ireland entered into a new era of Penal Laws and Protestant Ascendancy.[10] While such laws had affected Catholics to some extent in earlier times, 1695 marked a new effort to utilise the penal code to secure Catholic subjugation and Protestant ascent. The prohibitions and restrictions applied to areas

[9] Foster's figure comes from the calculations of Arthur Young. Foster (p. 211) suggests concerning the 5 per cent figure, 'this, however, ignores the considerable number who held profitable leases'.

[10] Foster (1988, p. 153) writes, 'the foundations of the Ascendancy rested on the penalization of Catholics'.

such as teaching, holding arms, keeping valuable horses, Catholic-Protestant intermarriage, and Catholic religious personnel, and also limited Catholic land and political interests, as well as excluding Catholics from government and professional positions (Joyce, 1908, pp. 226–230). However, the laws were not wholly enforced, and their impact on Catholic society was by no means uniform: remaining landowners were most adversely impacted, while merchants, manufacturers, and tenants were less obviously handicapped (Connolly, 2007, p. 462). Yet, at the top of the social hierarchy, the Protestant Ascendancy—whose identity was closely associated with Anglicanism—'monopolised law, politics and 'society'' (Foster, 1988, p. 170), and thereby limited the options for those outside this social elite. Hence, it is perhaps unsurprising that Catholics channelled significant energy towards trade and even achieved notable business success despite the Protestant hold on society (Cullen, 1968, p. 94; Wall, 1969, p. 38; Foster, 1988, p. 210).

With the advance of the eighteenth century, the Catholic situation gradually improved. Catholic Relief Acts granted Catholics rights to longer leases (1778), to purchase land (1782), and to enter the professions (1792 and 1793). However, it was several decades until the final handicaps to Catholics were overturned in the Catholic Emancipation Act in 1829, which, among other reliefs, admitted Catholics to Parliament. As well as the amelioration of these social and economic constraints, Catholics also benefitted in other areas, such as in education with the establishment of a National System of Education in 1834, which followed Catholic demands for state-funded elementary schooling. Arriving noticeably early, the National System arguably benefitted Catholics more than any of the other main denominations, not only by saving the Catholic Church a considerable amount of money, but also by yielding a sharp fall in Catholic illiteracy in the following decades (Akenson, 1970, pp. 377–

385).

Yet, while the seeds of change may have been sown in this previous century, it was surely the Great Irish Famine (1845–1849) which instigated a sharp impetus towards a wider "Catholic embourgeoisement". Foremost, was its disproportionately adverse impact on the Catholic population, both in mortality and emigration terms (Connolly, 1985, p. 3).[11] While unsurprising, given Catholic predominance in the lower classes, it is nevertheless suggestive of a radical adjustment of the prevailing class structure, and evidenced by the elimination of large numbers of cottiers, labourers, and paupers in the post-Famine era (Daly, 1981, pp. 31–32; Larkin, 1972, p. 639; Ó Gráda, 1995, p. 251). As well as possibly having an immediate effect in diminishing Protestant advantage, this may also have had long-run implications with the average Catholic now economically better-off, and having social values and relationships more favourable to economic advancement.[12]

This greater survivorship of a '"respectable" class of Catholics' vis-à-vis Catholics in the lower social order also resulted in a relatively stronger devotional core for the Catholic Church (Larkin, 1972, p. 639),[13] and coincided with a period of religious revival. This 'devotional revolution' was headed by reforming Cardinal Paul Cullen, and led to a great number of the Irish population becoming practicing Catholics (Larkin, 1972, p. 625).[14] By the turn of the century, universal attendance at mass was commonplace, and indigenous rituals had been displaced by continental-style

[11] Connolly (p. 3) suggests that between 1834 and 1861 the number of Catholics fell by 30 per cent, while the number of Anglicans and Presbyterians each fell by 19 per cent.

[12] Nonetheless, while this may have implications for the Catholicism-development relationship, geographical influences may complement any perceived religious effect due to denominational heterogeneity across counties. For example, western counties were greatly affected by the Famine, but likewise this is where Catholics were highly concentrated.

[13] Larkin (p. 639) suggests that they 'generally survived the famine intact, while the "bulk" of the cottiers, labourers, and paupers were swept away by starvation, disease, and emigration'.

[14] The 'devotional revolution' term appears to have been popularised by Larkin.

devotions, as religious practice became an expected attribute of Catholic identity (Fahey, 1994, p. 253).

Yet, while "devotional demand" may have contributed to a more spiritually-minded people, the Catholic Church too was active in extending its influence through "devotional supply". Perhaps most pronounced were the swelling ranks of talented clerical personnel, who provided much needed pastoral services (Drumm, 1999, p. 22),[15] and enabled the Church to extend its mandate more broadly in society. Between 1800 and 1900, the number of priests rose from 1,850 to 3,500, while between 1851 and 1911 the number of nuns rose from 1,500 to almost 9,000 (Fahey, 1994, pp. 249–250), even as the population fell.[16] This was also coupled with growing Catholic real-estate, including churches, chapels, and schools, all over the island (Larkin, 1967, p. 864). Together with the provision of new devotions (Fahey, 1994, p. 253), these factors highlight a Church enhancing its societal image, and, in doing so, generating economic credence to its supply of religious services.

The exact reasons for the post-Famine surge in Catholic religious practice has been the subject of scholarly debate: Larkin (1972) points to an identity crisis with the erosion of traditional Irish culture; Miller (1975) to the demise of peasant religion with the Great Famine and the acceptance of official Catholicism;[17] and Hynes (1978) to the triumph of the farming class for whom the devotional system complemented their

[15] This was not only in Ireland, 'education and health care provision became key pastoral goals in Irish Catholic communities throughout the world' (Drumm, p. 22). 'Whether in Belmullet or Brooklyn, Cricklewood or Cape Town, Limerick or Lagos, Irish priests, brothers and sisters pursued the same pastoral strategies from the 1850s until the 1960s' (Drumm, p. 22).

[16] The population fell from 8,175,124 persons in 1841, to 6,552,385 persons in 1851, and continued falling until several decades into the twentieth century; the population stood at 4,228,553 persons in 1926 (Vaughan and Fitzpatrick, 1978, p. 3). According to calculations using *Census of Ireland, 1871* (P.P. 1876, LXXXI), p. 85, and *Census of Ireland, 1901* (P.P. 1902, CXXIX), pp. 50, 107, in 1861 and 1901 the number of persons per clergy of the main denominations was as follows: Catholic: 1,495 and 892, Anglican: 306 and 359, and Presbyterian: 773 and 647.

[17] Miller suggests that peasant religion was linked to the harvests, which failed in the Famine period.

economic aspirations. Yet, although differing on the exact mechanics and timing, a general consensus emerges among these scholars on the significance of this "new" religious fervour in the modernisation and economic rationalisation of society (see also Larkin's later writing (1984, pp. 5–10)): the Famine served to (at least) accelerate the triumph of the bourgeois (strong) farming class, and their version of Catholicism which complemented the changing social norms in rural society.

As well as the more homogenous and developmentally-orientated population yielded by the Famine, and the ability of a strengthened Catholic Church to provide an institutional framework for regulating the family, the transformation of Catholic society was also aided by improving educational attainment under the National System of Education, and the rise of popular nationalism. Schools, which became increasingly denominational in character, provided a medium for promoting social teaching beyond the walls of the Church, and were also an instrument for the diffusion of human capital. Indirectly, they may also have been important for the rise of political consciousness, by yielding a more literate population better able to engage with political debate (Cullen, 1981, p. 238). Indeed, Garvin suggests that the nationalist revolutionaries who were involved in movements towards a "new", independent Ireland, were of 'the 'over-educated, under-regarded' element which élite theorists warned about' (Garvin, 1987, p. 42). Moreover, while they shared some of the traditional values expressed by priests, ultimately they were more developmentally orientated (Garvin, 1987, pp. 74–75), and this was perhaps echoed in the Ireland which emerged, with Daly (1992, p. 11) commenting:

> The fledgling Irish state therefore inherited a confused baggage of ideals: a desire to protect rural society and its values and to stabilize the rural population; a vision of industrial development minus the evils of capitalism, materialism, and urbanisation; a

desire to redress previous disadvantages suffered by Irish businesses; an expectation of material progress without state welfare provisions; the restoration of the Irish language and culture; and, though not explicit until the 1920s, the enshrining of Catholic social teaching.

In summary, then, with the decline of Protestant elitism, and the socioeconomic position of Catholics disproportionately improved by the Famine, Catholic society at large stood more favourably positioned for advancement. Led by a powerful stakeholder alliance that included the Catholic Church, nationalism, and a strong farmer class, and aided by a common bond between priest and people, Catholic society transformed into a more advanced and arguably more "anglicised" entity. Indeed, the cultural distinctions which differentiated Catholics and Protestants were, at least in economic terms, becoming more blurred as the religious majority converged with the religious minority.

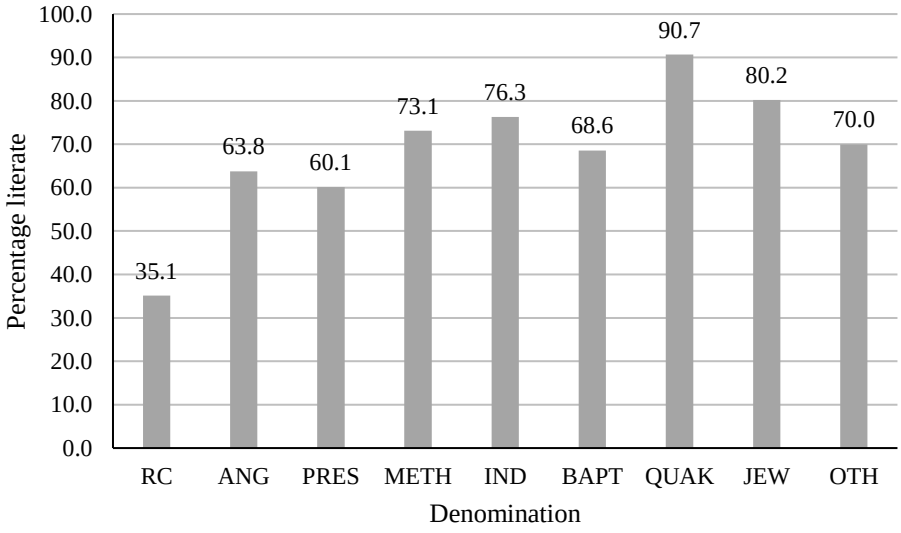

Figure 2.1. *Literacy (read and write) by religion in 1861*

Notes: Of the population 5 years old and upwards. The x-axis denomination labels may be interpreted as follows: RC = Roman Catholics; ANG = Established Church (Anglicans); PRES = Presbyterians; METH = Methodists; IND = Independents; BAPT = Baptists; QUAK = Society of Friends or Quakers; JEW = Jews; OTH = all other persuasions.

Source: Calculated using: *Census of Ireland, 1861* (P.P. 1863, LX), p. 558.

Table 2.1. *Males by religion and occupation in 1861*

Occupations		*RC*	*ANG*	*PRES*
Landed proprietors	(in denom pop)	1 in 932	1 in 116	1 in 714
	(% of occup)	40.9	50.6	6.2
Farmers and agriculturists	(in denom pop)	1 in 3	1 in 5	1 in 3
	(% of occup)	82.1	8.2	8.9
Commerce, manuf., & mech. trades	(in denom pop)	1 in 7	1 in 5	1 in 5
	(% of occup)	69.2	15.4	12.5
Clerical	(in denom pop)	1 in 732	1 in 150	1 in 376
	(% of occup)	48.0	36.1	10.8
Barristers	(in denom pop)	1 in 10,209	1 in 681	1 in 8,217
	(% of occup)	28.5	65.7	4.1
Attorneys	(in denom pop)	1 in 3,272	1 in 315	1 in 2,653
	(% of occup)	35.8	57.3	5.1
Physicians and surgeons	(in denom pop)	1 in 2,898	1 in 278	1 in 869
	(% of occup)	32.3	51.7	12.4
Apothecaries	(in denom pop)	1 in 10,500	1 in 1,984	1 in 9,435
	(% of occup)	50.1	40.8	6.4
Other liberal professions	(in denom pop)	1 in 6,159	1 in 597	1 in 3,352
	(% of occup)	33.6	53.3	7.1
Teaching	(in denom pop)	1 in 339	1 in 136	1 in 261
	(% of occup)	63.6	24.4	9.5
Civil service	(in denom pop)	1 in 172	1 in 56	1 in 246
	(% of occup)	63.7	29.9	5.1
Military and naval services	(in denom pop)	1 in 201	1 in 21	1 in 122
	(% of occup)	36.1	53.1	6.9
Miscellaneous	(in denom pop)	1 in 6	1 in 9	1 in 11
	(% of occup)	85.3	9.1	5.2
No specified occupation	(in denom pop)	1 in 3	1 in 3	1 in 3
	(% of occup)	76.7	12.6	9.3
Total population		77.7	12.0	9.0

Notes: RC = Roman Catholics; ANG = Established Church (Anglicans); PRES = Presbyterians; in denom pop = for a given denomination, the ratio of those having a particular occupational title to the denominational population; % of occup = percentage of a particular occupational title associated with a given denomination. Full occupation headings (in source) are: 1. landed proprietors; 2. farmers and agriculturists generally; 3. persons engaged in commerce, manufactures, and mechanical trades; 4. members of the learned professions: clerical, legal: barristers, attorneys, medical: physicians and surgeons, apothecaries; 5. members of other liberal professions; 6. persons engaged in teaching; 7. persons engaged in the civil service of the country; 8. members of the military and naval services; 9. miscellaneous; 10. persons having no specified occupation. According to page 61 in *Census of Ireland, 1861* (P.P. 1863, LIX) members of other liberal professions includes occupations such as architecture, engineering, literature, and music. 403 seamen and others at sea (religion unspecified) appear to be added into another category (unreported here) called other Protestant Dissenters. Their occupations do not appear to have been reported. The calculations above do not include 393 Jews whose occupations by gender were not included or noted in the report table.

Source: Calculated using: *Census of Ireland, 1861* (P.P. 1863, LIX), p. 62.

2.4. The Development Question

At a superficial level, it would be easy to offer Irish Catholicism as a case in support of Weber's "Protestant-ethic" thesis, citing the industrial might of Ulster, the superior educational attainment of Protestants, and greater Protestant representation in more advanced occupational pathways. Yet, to do so ignores underlying factors such as discrimination and geography, and thus fails in proving Catholicism was a specific *cause* of behaviour inimical to development. As Akenson (1988, p. 23) advocates, such attribution to Catholic culture 'is a confusion of association and causation'. This tenuous link has also been downplayed by previous authors who suggest that in the Irish case the Weber thesis remains unproven (at best) (Daly, 1981, p. 85; Lee, 1989, pp. 16–17; Ó Gráda, 1995, pp. 328–330). Even Plunkett (1905, pp. 104–105), while laying part of the blame with the Catholic Church, acknowledges a variety of historical factors such as educational deprivation, property restrictions, and social and political exclusion as attributing to Catholic economic backwardness—elements underscored by O'Riordan (1906) in his comprehensive reply.[18]

To address these causality concerns, a quantitative methodology is employed to investigate the association between Catholicism and various development indicators over time. While individual-level data would provide an ideal means of addressing the religion question, the unavailability of household census returns before 1901 greatly limits the extent to which such a strategy can be pursued in the context of this study. Recognising this constraint, various sources are utilised to consider the religion-development nexus in the post-Famine decades along three particular lines: education, occupations, and finance and business. Before describing the data and empirical

[18] That is O'Riordan's reply to Plunkett (1905).

strategy, some hypotheses are first outlined in light of existing scholarship.

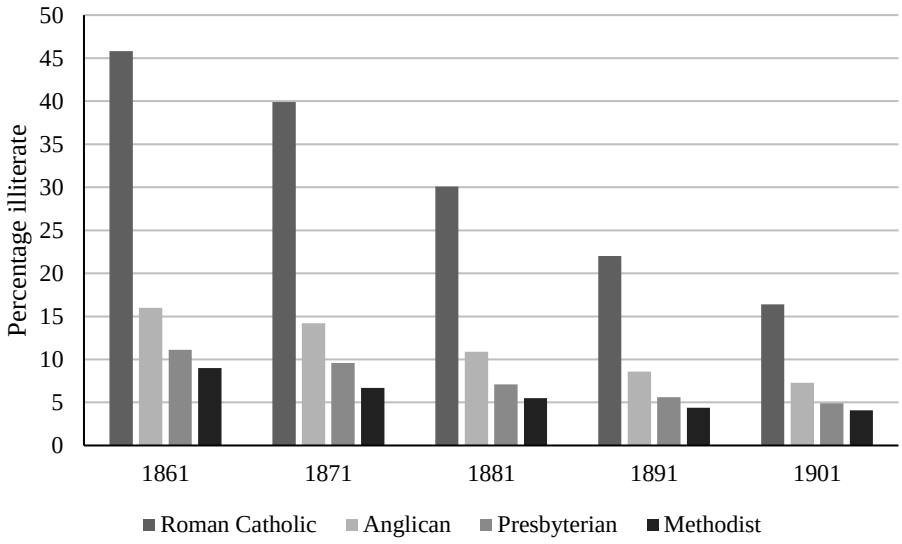

Figure 2.2. *Illiteracy by religion 1861–1901*

Notes: Of the population 5 years old and upwards.

Source: Census of Ireland, 1901 (P.P. 1902, CXXIX), p. 524.

Firstly, it is expected that Catholicism is positively associated with educational outcomes.[19] To clarify, that is not to say Catholics were necessarily ahead in this regard, but rather where there was religious disadvantage it was redressed over time. This is because with the rise of the National System of Education, and its increasing division along denominational lines, schooling for Catholics became both an available and acceptable pursuit. Indeed, as shown in figure 2.2, the post-Famine decades were marked by a sharp decline in illiteracy among Catholics (and also among the wider population), with Catholic illiteracy falling from 45.8 per cent to 16.4 per cent between 1861 and 1901. Moreover, Catholic attendance at schools as a percentage of the Catholic population similarly shows improvement between 1881 and 1911, rising from 13.15 per cent to 15.17 per cent for primary schools, and from 0.30 per cent to 0.98

[19] That is lower illiteracy and higher attendance.

per cent for superior establishments.[20]

Beyond these statistics, scholarship which attempts to distinguish the effect of religion as distinct from other possible determinants is limited. Ó Gráda's (2013) study on the Pre-Famine period is perhaps the best available analysis. Focusing on 1841, Ó Gráda reveals that Catholicism has a strong negative association with literacy, with Irish speakers and poor housing similarly having a negative relationship. Of course, whether the Catholic effect truly represents a strictly religious causal channel or instead captures other socioeconomic variation is difficult to fully discern. Nonetheless, however caused, there is a residual Catholic effect which is not entirely mitigated by a broad set of control variables. Hence, it is expected that Catholicism, even when controlling for other factors, is negatively associated with educational measures, although decreasingly so through time.

There is also perhaps a discrimination element to consider in the relationship between education and religion. It is possible that the returns to education and schooling were less for Catholics due to the discrimination they faced, particularly in employment. As such, the demand for education among Catholics may have been lower than the demand among Protestants. Indeed, the potential for such differences to arise is evidenced in recent literature such O'Higgins (2009) and Keswell (2010), which highlights that returns to education may vary according to social grouping. Overall, then, with discrimination against Catholics reduced with the passage of the nineteenth century, their incentives to acquire education were likely increased—thus

[20] *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), p. 60. 1881 and 1911: Anglicans: Primary = 12.69 and 14.04, Superior = 1.23 and 1.07; Presbyterians: Primary = 13.73 and 16.49, Superior = 0.65 and 0.81 (source as for Catholics). According to *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), p. lii, 'schools in which a foreign language is taught have been classed as "Superior" upon the assumed likelihood that the presence of a foreign language in the school course argues a higher standard of general instruction than is to be found where such an element is wanting'.

yielding a more positive association between Catholicism and education.

Secondly, it is expected that Catholicism is increasingly associated with advanced-occupation representation, particularly the professional class. Again, that is not to say Catholics were necessarily ahead in this regard, but rather where there was religious disadvantage it was redressed over time. This is because while Catholics had historically suffered from land redistribution to Protestants and faced barriers to employment in areas such as banking and the civil service, with Catholic Emancipation and the fall of Anglican elitism, the obstacles to Catholic ascent were slowly eroded. Furthermore, with advancements in education, Catholics also possessed the required academic ability for social advancement. Hence, it is perhaps unsurprising that existing evidence points to growing Catholic representation in areas such as medicine and law in the post-Famine era (Lee, 1989, p. 17). Indeed, Lee (1989, pp. 16–17) even postulates the presence a professional ethic in Irish society, where the professions were prized over trade as they offered status and financial reward. Hence for Catholics, this raises the interesting proposition of whether such occupational selection was more acute, given their burgeoning human capital, but restricted opportunities in the primary and secondary economic sectors.

Finally, for business and finance, it is expected that Catholic engagement rises over time. However, given the importance of existing networks in determining access in these areas, the change may be less pronounced than that for education or occupations. With regards to business more specifically, recent scholarly work by Campbell (2009) provides an excellent insight into the relatively static religious composition of the highest tiers in Irish business for the period of interest in this study. Using information on the largest Irish companies, both incorporated and private,

Campbell investigates religious representation between 1883 and 1911. His results, which relate to 247 individuals, reveal that Catholics were severely underrepresented in the business elite vis-à-vis their Protestant counterparts—holding just 19 per cent of the positions in the pooled-year sample (1883 and 1911) as compared to their 77 per cent and 74 per cent frequency in the population in 1881 and 1911.[21] By contrast, Protestants dominated the highest business positions, especially when considered in light of their minority status. Anglicans and Quakers were significantly overrepresented relative to their societal frequency, holding 68 per cent and 5.5 per cent of positions, while Presbyterian and Nonconformist representation more closely mirrored their societal presence (Campbell, 2009, p. 207).[22] Furthermore, the gap between Protestants and Catholics ameliorates little in the 30 year window, rising from 17 per cent in 1883 to 19 per cent in 1911, despite a significant depreciation of Anglican representation; instead adherents of the other Protestant denominations appear to have been the chief beneficiaries. Of course, as Campbell (2009, p. 239) suggests, these figures only reveal the status of the highest business echelons, and below this Catholics could be readily found as shopkeepers, publicans, and in medium-sized businesses. Hence, an attempt is made to identify some of these occupations from the available census information in the results section that follows.

On the more general issue of Catholic attitudes to business and entrepreneurship, as Kennedy (1978, p. 57) suggests, it seems unlikely that profit-motivated persons would rationally neglect investment opportunities where they existed despite clerical uneasiness about industrialisation or urbanisation.[23] And, even if the Catholic Church

[21] *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), p. xlvi.

[22] According to *Census of Ireland, 1881* (P.P. 1882, LXXVI), pp. 54–55, and *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), pp. xlvi–xlvii, Anglican and Quaker percentage of the population: 1881 = 12 per cent and 0.07 per cent, 1911 = 13 per cent and 0.06 per cent.

[23] However, Kennedy (p. 57) suggests that perhaps more fundamentally it is difficult to discern how significantly Catholic doctrine and related norms affected entrepreneurship supply.

absorbed some ‘entrepreneurial talent’ as Larkin (1967, p. 875) proposes, the loss of entrepreneurship may not have been significant since it represented an alternative career pathway to law or medicine (Kennedy, 1978, p. 53). The important point here, then, is not that Catholics lacked a materialistic and rational outlook, but rather that their energies were channelled towards upward mobility through the professions as opposed to business (Lee, 1989, pp. 16–17). Indeed, when provided with greater freedoms with the removal of the penal code, wealthy Catholics had the opportunity to gain new status, and so some of the new generation moved out of manufacturing and trade and into the professions (Wall, 1969, p. 47).

Turning to finance, the available evidence also points to the potential importance of religious differences, especially the prominence of Protestantism. Indeed, the banking profession was disproportionately dominated by Protestant personnel in the post-Famine decades. For example, in 1881, 31.7 per cent of male bank staff (bankers and bank service) were Catholic, compared to 50.2 per cent Anglican and 13.4 per cent Presbyterian.[24] Although improving thereafter, Protestants still commanded a substantial majority of banking posts by 1911, with Catholic representation (among males) rising to just 35.6 per cent.[25] Religion also permeated the identity of banks, with the institutions often associated with a particular religious-political persuasion such as the Hibernian and Munster and Leinster, which were Catholic and nationalist (Cullen, 1979, p. 48). Yet, beyond these staffing and religious-political details, there is a distinct lack of evidence on the propensity of the respective religious denominations to utilise financial services. Some intriguing detail is found in Ó Gráda’s (2008c) work on a Dublin savings bank, which provides some preliminary

[24] Calculated using: *Census of Ireland, 1881* (P.P. 1882, LXXVI), p. 111.
[25] Calculated using: *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), p. 10.

evidence of a higher Protestant representation among account holders than expected. McGowan (1990, p. 29) also suggests that savings banks focused their activities on non-Catholics. Yet, strong evidence on banking engagement still remains beyond the scope of current studies.[26]

Before moving to the analysis, it is important to acknowledge that factors beyond religion are surely important in development variation. For example, if one looks to education, previous studies have pointed to a variety of potentially relevant demand and supply factors in the nineteenth century such as the availability of employment opportunities (Fitzpatrick, 1990), and the prevalence of Sunday schools (Ó Gráda, 2013). Hence, the role of religion in the Irish context should be understood as but one of a pool of different and overlapping factors.

2.5. Empirical Strategy

As stated in the previous section, this chapter attempts to analyse the link between Catholicism and post-Famine development along three lines: education, occupations, and business and finance. By focusing on these distinct development areas and across time, the aim is to delineate more precisely the religion-development relationship, and also to ascertain whether religious differences ameliorate over the observation horizon. Generally, a cross-sectional (year-by-year) approach is adopted as it has the advantage of allowing comparison of the relationship between variables at each decennial point, rather than relying on year dummy variables which may fail to convey key changes over time or obfuscate any underlying relationships. A description of the variables and

[26] Notably, Sandberg (1978) links education with the propensity to utilise financial institutions. See also Sandberg (1979).

sources is shown in table 2.2, with summary statistics displayed in table 2.3. Robust standard errors based on White (1980) are used throughout the regressions.

Table 2.2. *Description of variables*

Variable name	*Description*	*Source*
County data		
Catholicism	The number of Catholics as a percentage of the population.	CR;V&F
Illiteracy	The number of those aged 12 years and over who can neither read nor write as a percentage of the population aged 12 years and over (where literacy ability known).	CR; UKDS
Irish-only speakers	The number of those who speak Irish only as a percentage of the population.	CR
1st or 2nd class housing	The number of families living in first or second class accommodation as a percentage of total families (where housing class known). Houses are classified by 'extent, as shown by the number of rooms', 'quality, as shown by the number of windows in front', and 'solidity and durability, as shown by the material of the walls and roof'. A typical second class house is described as 'a good farm-house, having five to nine rooms and windows'. Note, however, that the classification adjusts depending on the number of families resident in a house of a given class.	CR
Persons over 60	The number of persons aged over 60 years as a percentage of the population (where age specified).	CR; UKDS
Urban (1,500)	The number of persons living in urban settlements of 1,500 or more as a percentage of the population.	CR
Lower scholar attendance	The number of scholars attending under 80 days as a percentage of total scholars.	CR
Company registrations	The number of joint-stock company registrations in that year and the following four years.	PP
Bank branches	The number of joint-stock bank branches.	Thom's
Population/10,000	The population divided by 10,000.	V&F; CR
Barony data		
Catholicism	The number of Catholics as a percentage of the population.	CR
Illiteracy	The number of those aged 5 years and over who can neither read nor write as a percentage of the population aged 5 years and over.	CR
Irish speakers (1881)	The number of those who speak Irish as a percentage of the population in 1881.	CR
4th class housing	The number of families living in fourth class accommodation as a percentage of all families. Fourth class housing consists 'of mud, sod or stone cabins containing only one room'. Note, however, that the classification adjusts depending on the number of families resident in a house of a given class.	CR
Value/population (1851)	Poor law valuation in 1851 (in £s) divided by the population.	CR
Manufacturing	The number of families chiefly employed in manufacturing, trades, & c. as a percentage of all families (chiefly employed in either (i) agriculture, (ii) manufacturing, trades, & c., or (iii) other pursuits).	CR

Continued on the next page

Services	The number of families chiefly employed in other pursuits as a percentage of all families (chiefly employed in either (i) agriculture, (ii) manufacturing, trades, & c., or (iii) other pursuits).	CR
Ulster (narrow)	A dummy variable equal to one for the Ulster counties of Antrim, Armagh, Down, Londonderry, and Tyrone, and zero otherwise.	–
Ulster (all)	A dummy variable equal to one for all nine Ulster counties, and zero otherwise.	–

Poor law union data (all variables 1891 expect for savings information)

Catholicism	The number of Catholics as a percentage of the population.	CR
Value/population	Rateable valuation (in £s) divided by the population.	CR
4th class houses	The number of fourth class inhabited houses as a percentage of all inhabited houses. This only covers agricultural holdings.	CR
Population density	Population divided by area (in statute acres).	CR
Agriculture	Number of males aged 20 years and upwards employed in the agricultural occupational class as a percentage of all males aged 20 years and upwards.	CR
Industry	Number of males aged 20 years and upwards employed in the industrial occupational class as a percentage of all males aged 20 years and upwards.	CR
Average account size	Amount of deposits (in £s) in Post Office and Trustee Savings Bank accounts divided by the number of accounts at the same.	PP
Accounts per 100 persons	Number of savings accounts at Post Office and Trustee Savings Banks divided by the population (which itself is divided by 100).	PP
Savings per 100 persons	Amount of savings (in £s) at Post Office and Trustee Savings Banks divided by the population (which itself is divided by 100).	PP

Notes: Urban areas of 1,500 is selected as a control for urbanisation as it is available in the census reports across all years. The area of urban settlements changes slightly with the advancement of time. Bank branches does not include sub-branches or agencies (except on the rare occasion where it is indicated that it is open daily).

Sources: See below.

County data sources:

CR: *Census of Ireland, 1871* (P.P. 1872, LXVII); *Census of Ireland, 1871* (P.P. 1873, LXXII.Pt.I, LXXII.Pt.II); *Census of Ireland, 1871* (P.P. 1874, LXXIV.Pt.I); *Census of Ireland, 1871* (P.P. 1874, LXXIV.Pt.II); *Census of Ireland, 1871* (P.P. 1876, LXXXI); *Census of Ireland, 1871* (P.P. 1877, LXXXVII); *Census of Ireland, 1881* (P.P. 1881, XCVII); *Census of Ireland, 1881* (P.P. 1882, LXXVII); *Census of Ireland, 1881* (P.P. 1882, LXXVIII); *Census of Ireland, 1881* (P.P. 1882, LXXIX.1); *Census of Ireland, 1881* (P.P. 1882, LXXVI); *Census of Ireland, 1881* (P.P. 1882, LXXIX.697); *Census of Ireland, 1891* (P.P. 1890–91, XCV); *Census of Ireland, 1891* (P.P. 1892, XCI); *Census of Ireland, 1891* (P.P. 1892, XCII); *Census of Ireland, 1891* (P.P. 1892, XCIII); *Census of Ireland, 1891* (P.P. 1892, XC.1); *Census of Ireland, 1891* (P.P. 1892, XC.635); *Census of Ireland, 1901* (P.P. 1902, CXXII, CXXIII); *Census of Ireland, 1901* (P.P. 1902, CXXIV, CXXV); *Census of Ireland, 1901* (P.P. 1902, CXXVI, CXXVII); *Census of Ireland, 1901* (P.P. 1902, CXXVIII); *Census of Ireland, 1901* (P.P. 1902, CXXIX); *Census of Ireland, 1901* (P.P. 1904, CIX); *Census of Ireland, 1911* (P.P. 1912–13, CXIV); *Census of Ireland, 1911* (P.P. 1912–13, CXV); *Census of Ireland, 1911* (P.P. 1912–13, CXVI); *Census of Ireland, 1911* (P.P. 1912–13, CXVII); *Census of Ireland, 1911* (P.P. 1912–13, CXVIII); *Census of Ireland, 1911* (P.P. 1913, LXXX).

PP: *Joint Stock Companies* (P.P. 1871, LXII); *Joint Stock Companies* (P.P. 1872, LIV); *Joint Stock Companies* (P.P. 1874, LXII); *Joint Stock Companies* (P.P. 1875, LXXI); *Joint Stock Companies* (P.P. 1876, LXVIII); *Joint Stock Companies* (P.P. 1881, LXXXIII); *Joint Stock Companies* (P.P. 1882, LXIV); *Joint Stock Companies* (P.P. 1883, LXIV); *Joint Stock Companies* (P.P. 1884, LXXII); *Joint Stock Companies* (P.P. 1884–85, LXXI); *Joint Stock Companies* (P.P. 1886, LX); *Joint Stock Companies* (P.P. 1892, LXXII); *Joint Stock Companies* (P.P. 1893–94, LXXXII); *Joint Stock Companies* (P.P. 1894, LXXVII); *Joint Stock Companies* (P.P. 1895, LXXXIX); *Joint Stock Companies* (P.P. 1896, LXXVI).

Thom's: Thom's directory, (1871, 1881, 1891, 1901, and 1911).

V&F: Vaughan and Fitzpatrick (1978).

UKDS: Clarkson et al. (1997a, 1997b) UK Data Service.

Continued on the next page

Barony data sources:

CR: *Census of Ireland*, *1861* (P.P. 1863, LIV); *Census of Ireland*, *1861* (P.P. 1863, LV); *Census of Ireland*, *1861* (P.P. 1863, LXI); *Census of Ireland*, *1881* (P.P. 1881, XCVII); *Census of Ireland*, *1881* (P.P. 1882, LXXVII); *Census of Ireland*, *1881* (P.P. 1882, LXXVIII); *Census of Ireland*, *1881* (P.P. 1882, LXXIX.1).

Poor law union data sources:

CR: *Census of Ireland*, *1871* (P.P. 1877, LXXXVII); *Census of Ireland*, *1881* (P.P. 1882, LXXIX.697); *Census of Ireland*, *1891* (P.P. 1890–91, XCV); *Census of Ireland*, *1891* (P.P. 1892, XCI); *Census of Ireland*, *1891* (P.P. 1892, XCII); *Census of Ireland*, *1891* (P.P. 1892, XCIII); *Census of Ireland*, *1891* (P.P. 1892, XC.1); *Census of Ireland*, *1891* (P.P. 1892, XC.635).

PP: *Savings banks (Ireland)* (P.P. 1913, LVII).

Table 2.3. *Summary statistics*

	Year(s)	*Mean*	*Std. dev.*	*Min*	*Max*
County data					
Catholicism	1871	80.89	19.83	26.71	97.68
	1881	81.04	20.19	25.28	97.92
	1891	80.81	20.44	24.01	98.04
	1901	81.00	20.46	22.99	97.98
	1911	81.31	20.44	22.90	98.15
Illiteracy	1871	29.88	10.71	11.57	55.37
	1881	22.67	8.72	8.76	45.05
	1891	16.94	6.46	6.88	34.49
	1901	12.77	5.07	5.53	26.25
	1911	10.26	4.04	4.28	21.76
Irish-only speakers	1871	1.45	2.92	0.00	12.17
	1881	0.92	2.14	0.00	9.88
	1891	0.60	1.64	0.00	8.28
	1901	0.36	1.00	0.00	4.90
	1911	0.30	0.91	0.00	4.29
1st or 2nd class housing	1871	46.90	13.00	20.00	88.59
	1881	53.21	12.73	22.42	89.32
	1891	60.54	12.09	27.75	90.18
	1901	67.65	11.18	35.44	91.36
	1911	75.41	8.55	54.65	93.33
Persons over 60	1871	11.06	1.11	7.81	12.93
	1881	10.97	1.16	7.63	13.17
	1891	10.94	1.14	7.49	12.63
	1901	11.79	1.42	7.17	13.57
	1911	14.43	2.29	8.54	17.84
Urban (1,500)	1871	17.66	15.52	0.00	81.95
	1881	18.64	16.35	0.00	84.36
	1891	19.56	16.96	0.00	84.53
	1901	21.72	18.49	0.00	86.00
	1911	22.82	18.83	0.00	86.37
Lower scholar attendance	1871	50.11	5.41	39.13	61.04
	1881	41.33	4.62	33.26	50.94
	1891	33.91	4.53	27.43	44.80
	1901	31.80	3.59	25.16	38.87
	1911	26.92	4.12	19.18	35.28
Company registrations	1871	4.00	9.29	0.00	42.00
	1881	8.09	15.14	0.00	67.00
	1891	13.50	34.85	0.00	153.00
Bank branches	1871	9.72	6.50	3.00	32.00
	1881	12.97	8.11	4.00	42.00
	1891	13.19	8.76	4.00	45.00
	1901	14.28	9.98	4.00	46.00
	1911	15.84	11.53	5.00	50.00
Population/10,000	1871	16.91	11.01	5.16	51.71
	1881	16.17	11.19	4.66	49.56
	1891	14.70	10.98	4.09	47.12
	1901	13.93	11.83	3.77	54.53
	1911	13.72	12.45	3.63	58.08

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Barony data					
Catholicism	1861	82.08	22.34	5.67	99.63
Illiteracy	1861	39.21	13.93	8.66	83.61
4th class housing	1861	10.01	7.00	0.00	43.09
Value/population (1851)	1851	1.98	0.99	0.36	7.49
Irish speakers (1881)	1881	16.42	23.20	0.00	88.98
Manufacturing	1861	14.51	7.53	3.62	53.21
Services	1861	38.97	9.15	17.77	69.54
Poor law union data					
Catholicism	1891	82.61	21.71	6.81	99.56
Value/population	1891	3.11	1.44	0.60	11.59
4th class houses	1891	3.17	2.33	0.15	12.88
Population density	1891	0.27	0.55	0.06	5.99
Agriculture	1891	66.68	14.69	3.67	85.79
Industry	1891	19.52	9.19	6.98	66.74
Average account size	1881	25.13	7.95	8.23	52.39
	1912	29.29	8.92	5.94	50.72
Accounts per 100 persons	1881	1.95	2.09	0.08	9.67
	1912	9.73	6.76	2.52	50.84
Savings per 100 persons	1881	52.49	73.76	0.63	447.78
	1912	253.33	118.58	74.26	849.70

Sources: See table 2.2.

To consider the Catholic-education relationship, a number of strategies are implemented. First, baronial-level data are used in a similar manner to Ó Gráda (2013) to consider the relationship between Catholicism and illiteracy in 1861. The other variables include: fourth class (bad) housing to control for living standards; poor law valuation per head to control for wealth; Irish speakers to control for the cultural distinction and socioeconomic backwardness of more Irish speaking areas; occupational pursuits to control for differing literacy demand (see table 2.2); and Ulster to control for the literacy supply of Sunday Schools (similar to Ó Gráda (2013)). The advantage of this data is the small unit of observation, with 332 baronies available for analysis. However, after 1861 baronial-level data are very limited meaning that only a single-period insight can be yielded.

To address this data problem, a county-level approach is adopted thereafter as it provides arguably the most consistently available unit of analysis for the 1871 to 1911 period. This, however, only provides 32 observations per year, meaning there is a risk of overfitting the model. Recognising this problem, a simple specification is adopted, with a limited number of explanatory factors. Furthermore, the decomposed R-squared can be reported to deduce the relative importance of Catholicism beyond simply coefficient size and significance. As an additional check, years are pooled (1871 with 1881, and 1891 with 1901) and a dummy variable is included for the earlier year, to provide two further regressions with a greater number of observations. The rationale for the choice of the respective paired years is to provide early and late windows of a similar span. The main explanatory variables include: Irish-only speakers to control for language impediment, and the cultural niche they represent; first or second class housing to control for living standards; persons over 60 to control for an older demographic, perhaps more averse to modernisation; and urbanisation to control for

the effect of differences in urban and rural characteristics. To broaden the education focus, the regressions are repeated for attendance—allowing "engagement" to be considered alongside outcomes.

To further widen the human capital focus, data from the census reports on occupations by religion are also used. This means it is possible to consider how the occupational profile of the various denominations differed over time, without concerns about the ecological fallacy issue. In particular, attention is directed to the years 1881 and 1911 as they represent the largest span for the post-Famine era over which occupational composition can be reasonably compared. Admittedly, the analysis does not account for possible differences in age structure between religious groups (as this is unavailable), or control for other geography-specific factors. However, as a general indication of the changing composition of occupations in religious terms it does provide a useful insight into how the status of the Catholic population was changing over this four-decade period, and thus helps to address the notion of an "embourgeoisement" in the post-Famine era. Further information on some individual occupations is also provided for the years 1861, 1881, and 1911, to provide additional detail for a wider horizon. Focus is directed throughout to males only. A fuller explanation of the occupational data used is provided in the results section.

Similar to education a number of strategies are adopted to consider the link between Catholicism and finance and business. First, data at the poor law union level are used to investigate the association between Catholicism and savings—an approach which is particularly pertinent given the Weberian emphasis on Protestant thrift. The location, amount of savings, and number of savings accounts, is available for each Post Office and Trustee Savings Bank in Ireland. While data are available for several years,

focus is directed to the years 1881 and 1912 as they are the years closest to the census years, and also provide a reasonable time horizon. Three alternative dependent variables are used to analyse the Catholic-savings relationship—average account size, number of accounts per 100 persons, and amount of savings per 100 persons. The other variables, which are all from 1891, include rateable value per head to control for wealth; fourth class (bad) housing to control for living standards; population density to control for differences between rural and urban areas; and agricultural and industrial employment to control for possible savings pattern variation among persons in different sectors of employment.

Similar to literacy, a county-level, year-by-year approach is also taken to consider the relationship between Catholicism and the number of joint-stock bank branches over time. Because the dependent variable is the number of branches, a negative binomial model is used. Population size is also included as a control variable. Admittedly, joint-stock banking was organised into distinct branch networks which often catered to a specific religious clientele, for example Hibernian Bank for Catholics/nationalists. Yet given that these branches were distributed all over the island (albeit with some banks more concentrated in particular regions), it is expected that the location of a branch provides a reasonable reflection of financial development.

Similar to the previous approach for bank branches, the number of joint-stock company registrations is utilised to consider business development or entrepreneurship in a given area. Joint-stock companies cover a diverse range of activities and while arguably only capturing one organisational form, nevertheless provide some indication of entrepreneurial supply. Further statistics are also provided on the religious persuasion of various trader occupations over time to understand business endeavour

beyond company registrations, and also beyond Campbell's (2009) important work on the highest business echelons.

2.6. Results

2.6.1. Education

Table 2.4 takes advantage of the baronial-level data available for 1861 to analyse the relationship between Catholicism and illiteracy for the early post-Famine period. Consistent with Ó Gráda's (2013) work on the Pre-Famine period,[27] this reveals that on average a higher percentage of Catholics in a barony is associated with a higher percentage of illiterates even when controlling for other relevant factors, with Catholicism statistically significant at the 1 per cent level.[28] The other variables generally also have a significant relationship with illiteracy and with the expected coefficient signs: poor housing, Irish, and Ulster are positively related to illiteracy, while value per head and non-agricultural employment pursuits are negatively related.

Table 2.5 extends this analysis to county-level regressions for the years 1871 to 1911. This shows that on average a higher percentage of Catholics in a county is associated with a higher percentage of illiterates. Yet, the association of Catholicism with illiteracy diminishes through time as evidenced by the falling magnitude and statistical significance of the respective Catholicism coefficients. The control variables are also important, both statistically and economically, in explaining the percentage of illiterates across counties, with Irish-only speakers, persons over 60, and urbanisation all having a positive association, and upper-class housing a negative association.

[27] Although Ó Gráda focuses on literacy as opposed to illiteracy.

[28] When referring to statistical significance, this is at standard levels. Anything deemed statistically significant is so at least at the 10 per cent level.

Notably, the percentage of Irish-only speakers has a persistently large positive relationship with the percentage of illiterates, while persons over 60 generally becomes more important with the advancement of time.

The relative importance of the explanatory variables in explaining illiteracy variation is conveyed in the decomposed R-squared percentage values. As expected, the percentage of Irish-only speakers is a particularly important factor in illiteracy variation, complementing the large magnitude of the Irish-only speakers coefficient in the regression results. Housing class is also pertinent in a relative sense, and increasingly so through time, with its relative contribution rising from 26.1 per cent in 1871, to 35.3 per cent by 1901. However, perhaps most striking is the declining relative importance of Catholicism through time, which contrasts with the rising relative importance of an older demographic. In particular, Catholicism contributes 17.7 per cent to the R-squared value in 1871, but just 1.6 per cent by 1911, while persons over 60 contributes 3.2 per cent in 1871, rising to 12.7 per cent by 1911. As such, religious differences matter less in illiteracy variation in later decades, suggesting that Catholics have closed the gap with the rest of the population, while at the same time an older demographic becomes relatively more important. These results are corroborated by the pooled-year regressions (also shown in table 2.5), which reveal a similar pattern to the individual years.

Further county-level regressions are also reported for attendance in table 2.6. However, compared with the county-level illiteracy results, the R-squared values are low. Nevertheless, the results, if anything, suggest that Catholicism is negatively associated with lower scholar attendance (under 80 days). As such, there is some limited evidence that more Catholic areas possibly had better attendance among those

attending school.[29]

Overall, the results affirm that Catholicism is an important factor in post-Famine illiteracy variation, but decreasingly so through time. This trend resonates with the idea of Catholic social advancement in the post-Famine era, and may be related to the National System of Education, which had particular benefits for Catholics. In statistical significance terms, the 1891 to 1901 decadal period is where the relevance of Catholicism obviously wanes for illiteracy, and the percentage of persons over 60 becomes more important. The increasing statistical relevance of age complements the implementation of the National System of Education in 1831, since most of those under 60 in 1891 would have been students of this new system. Whatever the precise reasons for this convergence, the amelioration of Catholic disadvantage in literacy terms was likely important for the wider embourgeoisement of Catholic society given its implications for occupational advancement and political engagement. Furthermore, the results also indicate that attendance may have been higher in more Catholic areas—suggesting Catholics engaged well with education provision.

2.6.2. Occupations

Table 2.7 utilises the available occupational information by religion for males from the census reports for the years 1881 and 1911. The calculated values are organised into three groups of columns: 1881, 1911, and change over time. For the individual years, 1881 and 1911, the value reported is the percentage of overrepresentation or underrepresentation of a denomination based on its relative frequency in the population. Hence, Presbyterians may be over 100 per cent overrepresented in a given

[29] Using under 60 days or under 100 days instead for the dependent variable does not significantly change the results.

occupation, while the same could not be true for Catholics. The last column is the difference between the two years, and therefore illustrates if religious representation in a given occupational category has changed over time. The census reports aggregate the occupations into sub-orders, which amalgamate to form orders, and then classes. In the table the horizontal lines delineate the six classes: professional, domestic, commercial, agricultural, industrial, and indefinite and unspecified. Given the interest here in more advanced occupations, the professional sub-orders (with the exception of the defence order), and the commercial sub-orders (with the exception of the conveyance in men, goods, and messages order) are reported individually.

A number of interesting findings emerge. Firstly, Catholics are significantly underrepresented in professional and commercial class occupations, with instead Protestants, and especially Anglicans and Methodists overrepresented. Although less pronounced, Catholics representation is also lacking in industrial occupations, with Presbyterians and Methodists holding a disproportionately high percentage of positions. Contrasting with this, Catholics make up a disproportionate number of those in the agricultural class, while Anglicans and Methodists are underrepresented in this area. The columns pertaining to the change over time suggest an occupational transition in favour of Catholics. In the professions, Catholics see improved representation in government, law, medicine, teaching, and among engineers and surveyors. And while among literary and scientific persons there is a decline, it is difficult to interpret this result as the classification appears to have changed significantly between years.[30] Catholic improvement is also apparent in the dealers in money and insurance sub-orders of the commercial class, albeit with a slight decline

[30] This seems due to a difference in the inclusion of students, see: *Census of Ireland, 1901* (P.P. 1902, CXXIX), p. 23.

in the proportion of Catholic merchants and agents. The diminution of Anglican representation in the professional and commercial classes is especially striking.

It is also possible to make a reasonable comparison of some of the more advanced individual professions from 1861 to 1911, with the percentage of the three main denominations for males reported in table 2.8. This reveals that Catholic representation in these high-level occupations—police, clergy, barristers and solicitors, medical doctors, and teachers—increased noticeably in the post-Famine period. Contrasting with this, Anglican representation in the professions declined, while for Presbyterians the transition is less clear, suggesting an occupational-hierarchy trade-off between Catholics and Anglicans in particular.

Overall, these results are consistent with the notion of a general Catholic upward transition in the post-Famine era. Catholics were increasingly making up the more advanced occupations as Protestant dominance receded. As stated previously, with the advance of education and the demise of the penal laws the opportunities for a Catholic ascension were increased, and so perhaps it unsurprising that such a transition might occur, especially given suggestions about the esteem in which the professions were held.

2.6.3. Finance and Business

Table 2.9 analyses the relationship between Catholicism and savings at the poor law union level. The table is organised into two sections representing the two observation years for savings information. Three alternative dependent variables are employed in each year as a measure of saving engagement, namely, average account size, number of accounts per 100 persons, and amount of savings per 100 persons. Furthermore, separate regressions are reported when controlling for industrial employment and

agricultural employment. Apart from the savings information, the variables relate to 1891. The results reveal that Catholicism is generally less favourably associated with saving behaviour, although a difference in statistical significance terms is only shown in 1912. In 1881, the results are not as strong, perhaps because it was relatively early in the growth of the Post Office Savings Bank system. For 1912 the results suggest that Catholicism is associated with weaker saving behaviour, with significant differences observed for average account size, and the amount of savings per 100 persons. As such, the results suggest that, at least in terms of the amount of savings, Catholics, with the consolidation of the Post Office Savings Bank system by 1912, were possibly less inclined to save as much as their Protestant counterparts.

With respect to banking more generally, table 2.10 examines the relationship between Catholicism and joint-stock bank branch prevalence using the county-level approach adopted for some of the previous indicators, but now utilising a negative binomial model. This reveals that Catholicism is initially significantly negatively associated with the number of branches in a county, but by 1891 Catholicism is insignificant, suggesting religious differences matter less with the advancement of time.

Turning to business, Campbell's (2009) work has already demonstrated the relatively static nature of the upper echelons of Irish business in the post-Famine period, with Protestants retaining a strong hold on such positions. But what about business-type pursuits in the lower realms of Irish society? Table 2.11 shows the religious composition of a selection of trader occupations (using those highlighted by Kennedy (1979, p. 202) in his work on traders in the rural Irish economy). This suggests that Catholics could be readily found among traders in Irish society. Indeed,

Catholic representation was to a certain extent consistent with their societal frequency, and in some categories exceeding this—notably among publicans!

With respect to what might be more readily termed entrepreneurship, table 2.12 adopts the county-level approach already taken for some of the other development measures to investigate the link between Catholic concentration and company registrations using a negative binomial model. This, similar to some of the previous regressions, reveals a negative association between Catholicism and company registrations but with falling statistical significance over time.

Overall, these results suggest that religion was an important factor in variation in finance and business outcomes. With respect to finance, the results point to weaker saving behaviour among Catholics, and a diminishing statistical relevance of Catholicism for bank branch prevalence. While the weaker Catholic saving behaviour perhaps appeals to Weberian notions of Protestant thrift, it may also have been the case that savings institutions were more culturally associated with Protestantism, with McGowan (1990, p. 29) suggesting that savings banks focused their activities on non-Catholics. For banking more generally, the initial significant negative association between Catholicism and banking is perhaps unsurprising given the strong presence of Protestants among banking personnel, and with the diminishing significance of religion possibly connected to the increasing provision of Catholic-nationalist leaning bank branches. Furthermore, and adding to Campbell's (2009) important scholarship on the upper business echelons in post-Famine Irish society, the other results suggest that Catholics could be readily found in trader occupations, and thus were not particularly averse to small-business pursuits. In addition, the company registration results suggest that the importance of religious composition lessened with time—again

pointing to a possible economic improvement in the status of Catholics relative to their Protestant counterparts.

Table 2.4. *Catholicism and illiteracy, 1861*

	Controlling for manufacturing			*Controlling for services*		
	(a)	*(b)*	*(c)*	*(a)*	*(b)*	*(c)*
Catholicism	0.207***	0.240***	0.296***	0.219***	0.246***	0.300***
	(0.015)	(0.023)	(0.020)	(0.013)	(0.022)	(0.018)
4th class housing	0.155***	0.154***	0.176***	0.142***	0.143***	0.168***
	(0.053)	(0.053)	(0.052)	(0.050)	(0.051)	(0.050)
Value/population (1851)	-1.964***	-1.938***	-1.542***	-1.483***	-1.478***	-1.292***
	(0.322)	(0.316)	(0.298)	(0.336)	(0.333)	(0.315)
Irish speakers (1881)	0.372***	0.370***	0.379***	0.386***	0.384***	0.386***
	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)
Manufacturing	-0.120**	-0.120**	-0.060			
	(0.053)	(0.053)	(0.054)			
Ulster (narrow)		2.302*			1.875	
		(1.216)			(1.192)	
Ulster (all)			5.549***			5.424***
			(0.982)			(0.928)
Services				-0.107***	-0.103***	-0.058
				(0.039)	(0.039)	(0.039)
Constant	20.156***	17.098***	9.548***	20.552***	17.935***	10.103***
	(1.525)	(2.408)	(2.529)	(1.678)	(2.476)	(2.620)
Observations	332	332	332	332	332	332
R-squared	0.880	0.881	0.888	0.881	0.881	0.889

Notes: OLS model. The variables used are all barony level. See table 2.2 for full variable information. Robust standard errors are in parenthesis. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Sources: See 'barony data sources' in 'sources' footnote of table 2.2.

Table 2.5. *Catholicism and illiteracy, 1871–1911*

	1871	*1881*	*1891*	*1901*	*1911*	*1871&1881*	*1891&1901*
Catholicism	0.134***	0.083**	0.054**	0.019	0.008	0.107***	0.037*
	(0.033)	(0.031)	(0.025)	(0.021)	(0.018)	(0.030)	(0.022)
	[17.663]	[12.971]	[8.852]	[3.037]	[1.597]	[12.881]	[4.990]
Irish-only speakers	2.069***	2.259***	1.879***	2.668***	2.229***	2.138***	2.132***
	(0.314)	(0.470)	(0.402)	(0.570)	(0.349)	(0.342)	(0.418)
	[46.673]	[48.230]	[45.050]	[46.552]	[41.900]	[42.821]	[41.415]
1st or 2nd class housing	-0.403***	-0.383***	-0.365***	-0.279***	-0.246***	-0.401***	-0.328***
	(0.083)	(0.112)	(0.079)	(0.060)	(0.078)	(0.085)	(0.061)
	[26.053]	[28.423]	[32.076]	[35.282]	[34.954]	[27.566]	[34.366]
Persons over 60	0.934	0.857	1.973**	1.670**	0.805***	0.940	1.713**
	(0.760)	(0.650)	(0.871)	(0.617)	(0.218)	(0.647)	(0.672)
	[3.157]	[3.068]	[5.895]	[7.218]	[12.745]	[2.849]	[3.308]
Urban (1,500)	0.185***	0.158**	0.205***	0.162***	0.093**	0.178***	0.179***
	(0.064)	(0.066)	(0.072)	(0.055)	(0.037)	(0.056)	(0.057)
	[6.454]	[7.308]	[8.126]	[7.911]	[8.803]	[6.439]	[7.736]
Year 1871						3.654***	
						(0.545)	
						[7.444]	
Year 1891							3.184***
							(0.860)
							[8.184]
Constant	21.374*	21.940**	7.931	5.976	13.766*	19.752**	7.046
	(10.877)	(9.342)	(11.566)	(10.299)	(8.062)	(9.633)	(10.637)
Observations	32	32	32	32	32	64	64
R-squared	0.893	0.872	0.842	0.827	0.806	0.897	0.848

Notes: OLS model. The variables used are all county level. Year 1871 is a dummy variable for the year 1871; year 1891 is a dummy variable for the year 1891. See table 2.2 for full variable information. Robust standard errors are in parenthesis. For the 1871&1881 and 1891&1901 specifications the robust standard errors are clustered on the county. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1. Decomposed r-squared percentages are in square brackets.

Sources: See 'county data sources' in 'sources' footnote of table 2.2.

Table 2.6. *Catholicism and lower scholar attendance, 1871–1911*

	1871	*1881*	*1891*	*1901*	*1911*	*1871&1881*	*1891&1901*
Catholicism	-0.092**	-0.055	-0.120***	-0.068*	-0.047	-0.078*	-0.093***
	(0.045)	(0.047)	(0.035)	(0.035)	(0.035)	(0.041)	(0.034)
	[23.502]	[16.671]	[51.831]	[53.120]	[28.128]	[8.236]	[46.220]
Irish-only speakers	0.109	0.814**	0.871**	0.500	0.580	0.352	0.723*
	(0.311)	(0.333)	(0.354)	(0.432)	(0.773)	(0.283)	(0.365)
	[3.430]	[29.978]	[19.149]	[11.788]	[9.027]	[4.566]	[15.593]
1st or 2nd class housing	-0.157	-0.044	-0.110	-0.127	-0.126	-0.119	-0.113
	(0.112)	(0.098)	(0.087)	(0.075)	(0.131)	(0.077)	(0.073)
	[26.815]	[12.566]	[5.747]	[16.377]	[10.240]	[14.603]	[7.734]
Persons over 60	-2.049*	-1.804**	0.212	0.621	1.015*	-1.737**	0.588
	(1.068)	(0.823)	(0.688)	(0.825)	(0.496)	(0.731)	(0.643)
	[23.986]	[34.923]	[6.249]	[4.378]	[19.534]	[7.685]	[6.216]
Urban (1,500)	-0.110	-0.043	0.132	0.104	0.165*	-0.058	0.121
	(0.107)	(0.087)	(0.091)	(0.081)	(0.081)	(0.080)	(0.084)
	[22.267]	[5.861]	[17.023]	[14.338]	[33.071]	[4.088]	[12.459]
Year 1871						7.919***	
						(0.734)	
						[60.823]	
Year 1891							1.884**
							(0.805)
							[11.777]
Constant	89.391***	67.979***	44.842***	36.121***	21.681*	73.803***	37.154***
	(11.945)	(7.390)	(7.865)	(12.175)	(12.708)	(7.637)	(9.131)
Observations	32	32	32	32	32	64	64
R-squared	0.363	0.334	0.475	0.255	0.232	0.608	0.391

Notes: OLS model. The variables used are all county level. Year 1871 is a dummy variable for the year 1871; year 1891 is a dummy variable for the year 1891. See table 2.2 for full variable information. Robust standard errors are in parenthesis. For the 1871&1881 and 1891&1901 specifications the robust standard errors are clustered on the county. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1. Decomposed r-squared percentages are in square brackets.

Sources: See 'county data sources' in 'sources' footnote of table 2.2.

Table 2.7. *Religious representation of males by occupational category, 1881 and 1911*

	1881 Over/underrepresentation					*1911 Over/underrepresentation*					*Δ1881–1911*			
	Total	*RC*	*ANG*	*PRES*	*METH*	*Total*	*RC*	*ANG*	*PRES*	*METH*	*RC*	*ANG*	*PRES*	*METH*
National government	7,022	-20.2	132.7	-26.9	88.7	16,058	-4.3	43.9	-34.0	12.4	15.9	-88.9	-7.1	-76.3
Local government	20,020	-9.9	107.4	-52.1	-23.6	15,900	-0.9	43.3	-38.4	-22.2	9.1	-64.1	13.7	1.5
East India and colonial service	22	-34.8	304.6	-100.0	-100.0	22	-69.4	389.0	-53.5	234.7	-34.7	84.4	46.5	334.7
Defence of the country	39,873	-53.4	350.4	-41.4	184.0	33,717	-60.4	356.1	-32.2	144.4	-6.9	5.6	9.1	-39.6
Clerical profession	8,630	-23.5	113.5	12.3	265.4	9,840	-11.9	54.6	-12.3	121.5	11.5	-59.0	-24.6	-143.9
Legal profession	4,897	-31.9	204.7	-21.0	23.3	4,788	-30.7	141.7	26.4	49.2	1.3	-62.9	47.4	25.9
Medical profession	4,534	-47.0	214.6	68.6	137.9	4,608	-35.0	106.8	81.7	98.2	12.1	-107.8	13.1	-39.7
Teachers	8,486	-9.8	42.2	23.4	23.1	8,136	-5.6	16.8	20.1	3.2	4.3	-25.4	-3.3	-19.9
Literary and scientific persons	38,861	0.8	14.6	-19.9	-18.0	5,226	-6.1	38.7	-14.5	21.2	-6.9	24.0	5.3	39.2
Engineers and surveyors	1,430	-46.5	256.2	4.1	118.4	1,692	-45.1	190.2	46.8	52.3	1.4	-66.0	42.7	-66.1
Artists	2,518	-20.9	130.8	-22.4	71.1	2,847	-33.4	151.6	-2.0	65.5	-12.6	20.7	20.4	-5.5
Exhibitions, shows, games, &c.	196	-0.2	69.3	-77.3	-100.0	769	-13.6	93.9	-30.9	14.9	-13.4	24.6	46.5	114.9
Domestic	34,068	-0.6	44.5	-40.3	-69.7	25,831	-2.7	53.0	-37.0	-45.8	-2.1	8.5	3.4	23.8
Merchants and agents	19,598	-33.8	113.0	82.7	269.7	33,508	-35.2	92.2	87.5	212.5	-1.4	-20.7	4.8	-57.2
Dealers in money	2,369	-58.3	303.2	47.3	122.9	3,075	-52.5	218.9	68.2	110.7	5.8	-84.3	20.9	-12.2
Insurance	460	-57.0	186.2	144.8	417.0	2,687	-37.8	91.6	82.6	291.9	19.2	-94.6	-62.2	-125.1
Conveyance*	48,324	-5.9	17.2	6.4	45.5	62,126	-5.4	16.4	9.7	14.2	0.5	-0.7	3.3	-31.3
Agricultural	902,010	8.0	-36.0	-6.6	-41.1	721,669	12.6	-43.5	-21.0	-55.8	4.6	-7.5	-14.3	-14.7
Industrial	428,578	-4.1	5.0	27.2	20.5	434,699	-7.8	12.1	32.6	43.8	-3.8	7.1	5.4	23.3
Indefinite and non-productive	961,381	-1.1	3.5	-3.3	12.9	804,850	-1.3	4.3	-0.4	7.8	-0.1	0.9	2.9	-5.1

Notes: RC = Roman Catholics; ANG = Anglicans; PRES = Presbyterians; METH = Methodists. *Conveyance of men, goods, and messages. The census divides occupations into suborders, orders, and classes. Suborders make up orders, and orders make up classes. The horizontal lines above divide the occupations into their respective classes. For the first class—professional—the individual headings are suborders, except for defence of the country which is an order consisting of army (at home) and navy (ashore or in port) suborders. For the third class—commercial— the individual headings are suborders, except for conveyance of men, goods, and messages which is an order consisting of five suborders. See also further description in section 2.6.2.

Sources: Calculated using: *Census of Ireland, 1881* (P.P. 1882, LXXVI), pp. 108–117; *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), pp. 7–15.

Table 2.8. *Religious representation of males in various professions, 1861, 1881, and 1911*

	1861			*1881*			*1911*		
	RC	*ANG*	*PRES*	*RC*	*ANG*	*PRES*	*RC*	*ANG*	*PRES*
Police	68.1	26.8	4.7	72.9	22.5	3.9	78.0	16.3	4.6
Clergy	48.0	36.1	10.8	53.8	29.2	11.2	59.6	23.9	10.1
Barrister, Solicitor	34.1	59.2	4.9	39.5	51.4	5.2	44.5	37.6	12.7
Physician, Surgeon, GP	32.3	51.7	12.4	39.3	42.8	12.7	48.7	29.2	17.1
Teaching	64.0	24.2	9.4	69.1	17.6	11.1	70.3	15.1	11.7

Notes: RC = Roman Catholics; ANG = Anglicans; PRES = Presbyterians.

Sources: Calculated using: *Census of Ireland, 1861* (P.P. 1882, LXXVI), pp. 508–510; *Census of Ireland, 1881* (P.P. 1882, LXXVI), p. 110; *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), p. 9. Reporting headings are different in 1861 from 1881 and 1911.

Table 2.9. *Catholicism and savings, 1881 and 1912*

	Average account size		*Accounts per 100 persons*		*Savings per 100 persons*	
	(a)	*(b)*	*(a)*	*(b)*	*(a)*	*(b)*
1881						
Catholicism	0.012	-0.009	-0.016	-0.013	-0.699	-0.611
	(0.037)	(0.040)	(0.011)	(0.012)	(0.484)	(0.509)
Value/population	0.307	0.358	-0.015	0.086	-1.018	1.168
	(0.923)	(0.913)	(0.065)	(0.102)	(2.872)	(3.453)
4th class houses	-0.371	-0.341	-0.123***	-0.134***	-3.990***	-4.235***
	(0.325)	(0.322)	(0.039)	(0.046)	(1.364)	(1.459)
Population density	1.090	1.397	-0.228	0.196	-14.196	-5.066
	(1.048)	(1.056)	(0.354)	(0.539)	(9.144)	(12.501)
Agriculture	0.159**		-0.090***		-2.062***	
	(0.080)		(0.014)		(0.631)	
Industry		-0.293**		0.098***		2.312*
		(0.125)		(0.033)		(1.266)
Constant	13.452*	31.181***	9.792***	1.222	267.334***	68.962
	(7.591)	(4.035)	(1.482)	(1.123)	(63.446)	(49.699)
Observations	159	159	159	159	159	159
R-squared	0.065	0.072	0.508	0.376	0.258	0.204
1912						
Catholicism	-0.106***	-0.139***	-0.0003	0.010	-1.826***	-1.644**
	(0.021)	(0.024)	(0.017)	(0.021)	(0.619)	(0.637)
Value/population	-2.315***	-2.468***	-0.133	0.322	-17.447***	-14.037***
	(0.365)	(0.414)	(0.121)	(0.320)	(3.680)	(4.174)
4th class houses	0.157	0.216	-0.206*	-0.245	-5.259**	-5.711**
	(0.234)	(0.261)	(0.117)	(0.152)	(2.374)	(2.437)
Population density	2.041***	1.513**	1.114	3.050**	20.914*	34.969**
	(0.721)	(0.641)	(0.930)	(1.358)	(11.329)	(15.221)
Agriculture	0.387***		-0.355***		-3.625***	
	(0.047)		(0.050)		(0.722)	
Industry		-0.568***		0.356***		4.289***
		(0.069)		(0.073)		(1.612)
Constant	18.410***	58.471***	34.165***	0.936	711.196***	357.797***
	(3.905)	(2.339)	(4.222)	(1.823)	(82.924)	(58.865)
Observations	159	159	159	159	159	159
R-squared	0.607	0.545	0.698	0.482	0.526	0.467

Notes: OLS model. Savings information is for 1881 and 1912, while the remaining data relate to 1891. The variables used are all poor law union level. See table 2.2 for full variable information. Robust standard errors are in parenthesis. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Sources: See 'poor law union data sources' in 'sources' footnote of table 2.2.

Table 2.10. *Catholicism and bank branches, 1871–1911*

	1871	*1881*	*1891*	*1901*	*1911*	*1871&1881*	*1891&1901*
Catholicism	-0.008***	-0.008***	-0.002	0.001	0.001	-0.008***	-0.000
	(0.002)	(0.001)	(0.002)	(0.003)	(0.004)	(0.001)	(0.002)
Irish-only speakers	-0.039*	-0.069***	-0.053**	-0.036	-0.003	-0.052***	-0.041*
	(0.020)	(0.018)	(0.022)	(0.033)	(0.034)	(0.017)	(0.022)
1st or 2nd class housing	-0.016**	-0.026***	-0.012*	-0.005	-0.002	-0.020***	-0.008
	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.005)	(0.007)
Persons over 60	0.235***	0.277***	0.230***	0.171*	-0.009	0.242***	0.179***
	(0.035)	(0.060)	(0.069)	(0.099)	(0.041)	(0.045)	(0.062)
Urban (1,500)	0.016***	0.016***	0.009	0.008	-0.001	0.014***	0.007
	(0.005)	(0.005)	(0.005)	(0.007)	(0.006)	(0.004)	(0.006)
Population/10,000	0.044***	0.048***	0.051***	0.047***	0.039***	0.046***	0.048***
	(0.003)	(0.002)	(0.004)	(0.007)	(0.007)	(0.003)	(0.005)
Year 1871						-0.422***	
						(0.047)	
Year 1891							0.008
							(0.063)
lnalpha	-17.618***	-85.822	-17.862***	-5.899	-3.540***	-17.635***	-17.244***
	(0.417)	(0.000)	(1.364)	(5.673)	(0.461)	(0.712)	(0.737)
Constant	-0.030	0.445	-0.037	-0.005	2.366***	0.499	0.168
	(0.426)	(0.608)	(0.783)	(1.508)	(0.883)	(0.503)	(0.810)
Observations	32	32	32	32	32	64	64

Notes: Negative binomial model. The variables used are all county level. Year 1871 is a dummy variable for the year 1871; year 1891 is a dummy variable for the year 1891. See table 2.2 for full variable information. Robust standard errors are in parenthesis. For the 1871&1881 and 1891&1901 specifications the robust standard errors are clustered on the county. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Sources: See 'county data sources' in 'sources' footnote of table 2.2.

Table 2.11. *Religious composition of various trader occupations for males, 1881–1911*

Occupation	*Year*	*Total*	*RC*	*ANG*	*PRES*	*METH*	*OTH*
Publicans etc.	1881	5,351	81.4	8.7	9.0	0.4	0.5
	1891	6,234	85.0	7.5	6.4	0.4	0.7
	1901	6,463	87.7	6.5	4.7	0.4	0.8
	1911	6,209	88.6	6.0	4.6	0.3	0.5
Grocers etc.	1881	11,776	65.1	11.4	18.8	2.7	2.1
	1891	13,026	61.6	12.7	19.6	3.4	2.7
	1901	13,614	61.8	12.3	19.7	3.6	2.5
	1911	12,754	62.7	12.6	18.6	3.5	2.6
General shopkeepers etc.	1881	12,678	83.2	9.0	6.0	1.1	0.7
	1891	12,356	81.4	9.5	6.0	2.0	1.1
	1901	12,691	82.5	8.8	5.9	1.7	1.1
	1911	11,817	82.1	9.2	5.8	1.3	1.7
Street sellers etc.	1881	1,031	84.2	8.5	5.2	0.4	1.6
	1891	1,410	66.3	8.7	5.4	0.7	18.9
	1901	1,545	64.6	8.0	5.6	1.0	20.8
	1911	1,312	76.2	9.2	5.4	1.0	8.2

Notes: RC = Roman Catholics; ANG = Anglicans; PRES = Presbyterians; METH = Methodists; OTH = Others. The full occupational titles are: (1) inn keeper, hotel keeper, publican; (2) grocer; tea, coffee, chocolate—maker, dealer; (3) general shopkeeper, dealer; (4) costermonger, huckster, street seller. In 1881 both grocers etc. and general shopkeepers etc. had 2 persons tabulated in an extra 'information refused' religious profession category. These are included in the 'Total' and 'OTH' figures.

Sources: Calculated using: *Census of Ireland, 1881* (P.P. 1882, LXXVI), pp. 114, 117; *Census of Ireland, 1891* (P.P. 1892, XC.1), pp. 118, 121; *Census of Ireland, 1901* (P.P. 1902, CXXIX), pp. 121, 124; *Census of Ireland, 1911* (P.P. 1912–13, CXVIII), pp. 12, 15.

Table 2.12. *Catholicism and company registrations, 1871–1891*

	1871	*1881*	*1891*	*1871&1881a*	*1881&1891a*	*1871&1881b*	*1881&1891b*
Catholicism	-0.021***	-0.014***	-0.007	-0.014***	-0.009**	-0.014***	-0.011**
	(0.008)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.005)
Irish-only speakers	-0.109	-0.004	-0.110*	-0.032	-0.042	-0.072**	0.013
	(0.073)	(0.030)	(0.057)	(0.035)	(0.028)	(0.033)	(0.035)
1st or 2nd class housing	-0.005	-0.028*	-0.035*	-0.015	-0.032**	-0.031**	-0.025***
	(0.028)	(0.015)	(0.020)	(0.014)	(0.013)	(0.013)	(0.010)
Persons over 60	0.194	0.204	0.267	0.144	0.231**	0.380**	0.047
	(0.229)	(0.143)	(0.234)	(0.144)	(0.109)	(0.149)	(0.149)
Urban (1,500)	0.028	0.040***	0.069***	0.030**	0.052***	0.031**	0.068***
	(0.025)	(0.014)	(0.026)	(0.013)	(0.012)	(0.012)	(0.011)
Population/10,000	0.082***	0.066***	0.067***	0.072***	0.069***	0.076***	0.067***
	(0.007)	(0.005)	(0.012)	(0.012)	(0.007)	(0.006)	(0.010)
Year 1871				-0.841*		-1.148***	
				(0.450)		(0.220)	
Year 1881					-0.366**		-0.217
					(0.185)		(0.180)
lnalpha	-17.577***	-17.666***	-1.509**	-3.361	-2.194***	-14.454**	-2.384***
	(0.912)	(0.537)	(0.666)	(2.852)	(0.672)	(7.077)	(0.605)
Constant	-1.799	-0.075	-1.182	-0.071	-0.442	-1.874	0.995
	(1.885)	(0.947)	(2.403)	(1.140)	(1.030)	(1.226)	(1.576)
Observations	32	32	32	64	64	60	60

Notes: Negative binomial model. In the pooled-year regressions 'a' denotes where all counties are included, and 'b' denotes where Antrim and Dublin are excluded. The variables used are all county level. Year 1871 is a dummy variable for the year 1871; year 1881 is a dummy variable for the year 1881. See table 2.2 for full variable information. Robust standard errors are in parenthesis. For the pooled-year specifications the robust standard errors are clustered on the county. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Sources: See 'county data sources' in 'sources' footnote of table 2.2.

2.7. Conclusion

This chapter has revisited a debate initiated by Horace Plunkett at the turn of the twentieth century, namely, what is the relationship between Catholicism and economic development in Ireland? Plunkett, similar to his contemporary Max Weber, attributed variation in economic outcomes to religious differences—with Catholicism conveyed as inferior to Protestantism in this respect. In particular, Plunkett (1905, pp. 101–102) suggested that some of the tendencies of Catholicism were inimical to economic advancement, and went further, postulating 'a defect in the industrial character of Roman Catholics'.

Using new data, and the benefit of hindsight, this chapter provides an alternative narrative to the role of religion in Irish historical development. Overall, Catholicism emerges in a positive light—yes lagging initially in development terms (or starting from a lower base), but generally closing the gap with Protestantism over time. Indeed, in all development areas investigated—education, occupations, and business and finance—there has been evidence of the diminishing importance of religion, suggesting Catholics converged economically with their Protestant counterparts in the post-Famine decades.

This favourable trajectory shown by Catholicism complements historical evidence on a "Catholic embourgeoisement" in the post-Famine era and the increasing "anglicisation" of society at large. At its root, lies the gradual erosion of differences which distinguished Catholics and Protestants in economic terms: (i) *legal differences* with the removal of the penal laws and Catholic Emancipation, (ii) *human capital differences* with the arrival of the National System of Education and rising literacy,

and (iii) *cultural differences* with the decline of the Irish language and peasant religion. Of course, also closely linked to this improving Catholic situation is the sudden demographic adjustment yielded by the Famine, which led to an abrupt improvement in the economic position of the average Catholic, and a reorganisation of Catholic society.

Overall then, and in line with Akenson's (1988, p. 149) expectations about future research on this topic, the findings in this chapter go some way to address the erroneous assertion that Catholicism was inhibitive to development.[31] Yes, initially there are signs that Catholicism was negatively associated with development outcomes, but these differences tended to diminish over the period of analysis. The question remains—with the improving position of Catholics economically, socially, and politically, to what extent did their ascension reach, especially in the new "Catholic" Ireland which emerged after independence.

[31] Akenson (p. 149) writes, 'In the field of Irish history, one of the main errors that will disappear through a more considered appraisal of the available evidence is the belief that there was a causal connection between Roman Catholicism and technological inflexibility and economic backwardness'.

3. Human Capital and Protestantism: Micro Evidence from Early Twentieth-Century Ireland

3.1. Abstract

This chapter contributes to a growing literature examining the effect of Protestantism on economic growth in historical economies. Recent findings in this area have emphasised the importance of human capital as a mediating channel rather than the more conventional "Protestant work-ethic" platform. Using a large individual-level dataset from the 1911 Irish census, we provide new evidence on this human capital channel from a microeconometric perspective. Focusing on literacy and numeracy (as revealed by age-heaping propensity), we show that all Protestant denominations were less likely to be illiterate and to age heap compared to their Roman Catholic counterparts. This difference is consistent across a variety of subsamples and robust to the inclusion of an extensive set of control variables. This result also holds when we exploit geographical variation in Protestant concentration by using the minimum distance to a British port as an instrument for Protestantism. Furthermore, we find intra-Protestant variation for literacy, but not for age heaping, and suggest that this may reflect the importance of both religious and wider cultural factors for human capital variation.

3.2. Introduction

The Weberian thesis (Weber, 1904/5), which famously attributed the rise of Western capitalism to Protestantism, has attracted considerable academic criticism in the century following its publication (Tawney, 1926; Fischoff, 1944; Samuelsson, 1957).

Much of this criticism has centred on Weber's Protestant-ethic explanation for religious variation in economic outcomes, which emphasised a specific work-ethic and thrift as conducive to Protestant affluence. While this causal pathway has been largely downplayed,[32] the classic Weberian connection between religion and economy nevertheless continues to attract empirical support (Grier, 1997; Barro and McCleary, 2003; Noland, 2005), with recent scholars instead proposing a variety of alternative mechanisms through which a religious effect may operate.[33]

Perhaps most prominent in the Protestant case has been the Becker and Woessmann (2009, 2010) human capital interpretation of Protestant economic history. Looking to nineteenth-century Prussia, they suggest Protestants prospered not because the Reformation marked a psychological watershed as Weber advocated, but instead due to a new emphasis on reading the Bible for oneself. This, they argue, promoted human capital gains, with the resultant literacy difference explaining almost the entire gap in economic outcomes between the Christian denominations. Yet, more recently, Boppart et al. (2014) raise the possibility that Protestant motivation went beyond the acquisition of reading skills. Using the results of pedagogical examinations from late nineteenth-century Switzerland, they show Protestants led in a variety of cognitive areas including reading, writing, history, and maths. Indeed, while their study reveals a specific Protestant motivation to accrue reading ability, the authors emphasise wider Protestant investment in other education areas in line with the broader educational goals of the main reformers.

We contribute to this wider literature by using a large sample of individual-level

[32] See contributions such as Delacroix and Nielsen (2001) and Andersen et al. (forthcoming).

[33] For example democracy (Woodberry, 2012), knowledge diffusion (Bai and Kung, 2015), social ethic (Arruñada, 2010), and trust (La Porta et al., 1997).

data from the full population census of Ireland in 1911 to estimate the relationship between Protestantism and human capital. Our focus on the Irish population at the start of the twentieth century has four key advantages. Firstly, by utilising the household returns of the 1911 census, we are able to focus on the individual-level relationship between Protestantism and human capital. As such, we extend on the aforementioned studies, which utilise aggregate-level data, and thereby deal with the ecological fallacy concern that the inference of aggregate-level data may be inconsistent with patterns observed at the individual level (Robinson, 1950; Selvin, 1958). Indeed, the absence of studies utilising individual-level data to estimate this relationship was highlighted in a recent survey paper by Becker et al. (2016). Secondly, we are able to provide coverage for the entire population, and so mitigate biases connected with small population samples and alternative sources to the census. However, we limit our analysis to household heads to avoid issues relating to the reporting of other individuals' characteristics (Blum et al., 2017). Thirdly, the individual returns from the 1911 Irish census contain a wealth of demographic and geographic information. Unlike other censuses, the Irish census surveyed respondents' religious affiliation and literacy. These data are rich enough to allow us to use a battery of demographic control variables such as street fixed effects, surname fixed effects (thus capturing genetic differences), and occupation fixed effects. Finally, as a region Ireland should be of particular interest to scholars interested in the relationship between religion and human capital. The Protestant Reformation largely failed in Ireland, although its legacy was to leave a considerable minority population. While this population tended to be wealthier and spatially concentrated in the North East, these correlations were far from perfect. Thus, the Irish context provides substantial in-sample variation to explore econometrically.

Our analysis reveals that religion is a persistent factor in both literacy and age-heaping based estimates of numeracy. In our full sample, we find that Anglicans and Presbyterians are approximately 4.5 and 8.5 per cent more likely to be fully literate than Catholics, and around 3.5 per cent less likely to age heap. These effects are robust to the inclusion of a large number of controls designed to offset any potential confounding bias. Furthermore, these results are reasonably stable among a host of population subgroups. The spread of Protestantism in Ireland was heavily influenced by British planters in the early modern period and, by extension, proximity to Britain. An instrumental variable (IV) analysis, that uses plausibly exogenous variation created by distance to the nearest major British port in the early modern period, produces nearly identical coefficients to the aforementioned. As alluded to previously, we also find some evidence of intra-Protestant denominational differences as the literacy difference appears to be stronger for Presbyterians compared to those in the Church of Ireland (Anglicans). However, this finding is not replicated when age heaping is used as the measure of human capital.

The consistent gap in both literacy and age-heaping propensity we find between Irish Catholics and Protestants complements an existing literature which has underscored the role of religion in the historical diffusion of human capital. At the macro level, such scholarship tends to emphasise a distinct change in the educational motivations of a specific religious group in facilitating long-run human capital divergence. For example, in the Christian case this manifested in the Protestant Reformation, which placed a new emphasis on Bible reading, and provided an important catalyst in the spread of mass schooling (Landes, 1999, p. 178; Woodberry, 2011, pp. 113–115), while for Judaism, changing religious norms from the second century CE resulted in greater investment in education, and facilitated Jewish

transition into more advanced occupations (Botticini and Eckstein, 2007). Yet, as emphasised in further work, the exact response of human capital to religious influence may depend on a variety of time and space specific factors such as denominational nuances (McCleary, 2013; Akçomak et al., 2016), the political influence of religious elites (Chaney, 2016), competition (Gallego and Woodberry, 2010), and conservatism (Boppart et al., 2013). Indeed, in the Irish case, the role of religion appears to be as a channel for the transmission of distinct cultural traditions—originating in the differing social origins of the Catholic and Protestant populations, but perpetuated by the institutional organisation of society along religious lines.

The remainder of this chapter proceeds as follows: section 3.3 discusses the measurement of historical human capital, section 3.4 hypothesises why human capital differences may exist between Catholics and Protestants in Ireland, section 3.5 summarises our data, section 3.6 presents our results, and section 3.7 provides discussion and conclusion.

3.3. Human Capital and the Measurement of Historical Development

Given that human capital underlies modern theories of economic growth (Romer, 1986, 1990; Galor, 2005, 2011), the ability to evaluate human capital acquisition in historical societies provides a promising means to advance our understanding of development through time and space. Assessing such endowments in modern settings is relatively unproblematic given the variety and sophistication of measures available (such as the highest academic qualification achieved or the number of years of schooling), but for historians often these conventional sources have to be substituted by more simple and novel means. In this study, we focus on two such measures: literacy and age heaping.

For the purpose of this inquiry, individuals are regarded as "literate" if they indicate that they can both read and write. The advantage of using literacy is that it is arguably the most universal and foundational measure of human capital available. In addition, illiteracy was still prevalent in early twentieth-century Ireland, thus giving us the necessary in-sample variation. The emergence of literacy in Western societies at the end of the nineteenth century is consistent with the use of literacy as a measure of human capital as this rise in literacy appeared to go hand-in-hand with the growth of state-sponsored school systems and compulsory schooling legislations. Consequently, this link has been used by a number of scholars interested in the relationship between human capital and economic development (Sachs and Warner, 1997; Galor and Moav, 2004; Becker and Woessmann, 2009). Of course, as pointed out by Reis (2005), human capital gains, such as literacy acquisition, may serve a dual purpose: investment and consumption.[34]

The disadvantage of using literacy relates to its elementary and unidimensional nature. Firstly, it does not capture any differences in reading or writing ability among the literate population, and instead offers a binary indicator, which is often self-reported and thus affected by personal subjectivity. Furthermore, it only provides evidence on one aspect of human capital, and does not inform us about other important characteristics which may be more relevant for variation in economic development.

To widen the human capital focus, we also use age heaping as an alternative measure of human capital, which arguably captures a different dimension of cognition, namely, an individual's numerical ability. The indicator has been applied in Irish

[34] On the one hand human capital represents an investment that potentially opens up occupational opportunities to the acquirer, but on the other hand human capital may also have a consumption purpose where, for example, satisfaction is provided for the individual through pursuits such as book reading (Reis, 2005).

economic history from at least Mokyr and Ó Gráda (1982) and Mokyr (1983), and exploits the tendency of people to erroneously approximate their age, with "heaping" occurring especially at numbers terminating in five or zero. As such, it provides a useful proxy for numeracy and thus aids in assessing human capital differences along cognitive lines, under the assumption that less numerate populations exhibit greater rounding propensity.

Yet, as Davids (2013) reminds us, the exact correlation between age awareness and quantitative ability remains elusive: we simply do not know the extent to which age reporting accuracy is commensurate with an individual's numerical ability. Nevertheless, the available evidence suggests that the application of age heaping as a human capital indicator is justified. Hippe (2012) shows that age heaping correlates well with literacy across time and space. Further scholarship also demonstrates a strong link between age-heaping propensity and other potential determinants of numeracy such as school enrolment and the use of Chinese instruments of number (Crayen and Baten, 2010). Indeed, in the absence of school-based measures of human capital, age heaping might actually provide a superior reflection of cognitive skills over other self-reported indicators such as literacy, given that its expected distribution is known. Moreover, even if age-heaping propensity reflects a broader set of factors such as attitudes to time and accuracy—such factors are arguably valuable human traits in economic growth (Mokyr, 1983). This sentiment is echoed in recent work by A'Hearn et al. (2016) who caution against using age heaping as an indicator of numeracy, but suggest that while it does not directly reflect numeracy, it does provide an indication of modernisation. Concluding their paper, A'Hearn et al. (2016, p. 24) write, 'what it directly measures, we argue, is not numeracy but a mix of contextual factors that are just as interesting for diagnosing and predicting economic

development'.

Indeed, the limitations of age heaping as a human capital indicator are recognised by previous scholars, with a number of important nuances highlighted which merit consideration. Firstly, age awareness, and thereby heaping propensity, may be related to institutional factors such as the need to document one's age in accessing social privileges or obligations such as marriage, voting, or military conscription (A'Hearn et al., 2009). Secondly, ageing may affect both the nature and extent of heaping. For example, Crayen and Baten (2010) suggest that age heaping on multiples of two is more common among children and teenagers, and highlight for older persons potential factors such as forgetfulness and being proud of one's age as potentially relevant for the accuracy of age reporting. Further scholarship by Földvári et al. (2012) and Blum et al. (2017) also suggests marital status and gender may play a role, with married women adapting their age to that of their spouse and thus creating a misleading picture of the age distribution in census returns.

In the Irish case, the age distribution of the population in the 1911 census has attracted attention from a number of scholars. Initially, commentators believed that the relatively large proportion of the population aged 70 years and above reflected the superior health of the Irish population. However, Lee (1969) demonstrated that the rise in the age distribution was an artefact of the 1908 Old Age Pensions Act in Ireland. Under this Act, Irish people had the incentive to claim to be older in order to receive the pension entitlement, and because policemen also functioned as census enumerators, many who had lied to qualify for the pension in 1908 had also misreported their age when completing the census. This explains why there is a large spike in the number of individuals aged 73, as one would needed to have been 70 in

1908 to qualify for the pension. Budd and Guinnane (1991) provide econometric evidence of this age exaggeration by linking individuals in both the 1901 and 1911 census returns. They find that age misreporting was more common among the poorest in Irish society, and that Catholics were more likely to misreport compared to their Protestant counterparts.

The findings documented in Budd and Guinnane (1991) imply that the 1908 Old Age Pensions Act might influence age heaping in our sample. However, in the subsequent analysis we can alleviate concerns on this front in a number of ways. Firstly, the oldest individual in our data is 62 years. This would mean that they would have to exaggerate their age by over a decade in 1908 to qualify for the pension. Secondly, we only look at male household heads who would typically be the chief breadwinners in families, and who would struggle to support a family on just the state pension. Finally, the work of Budd and Guinnane (1991) indicates that if misreporting from the Old Age Pensions Act affects our data sample, this would mean that we are more likely to lose Catholics from the lower end of the socioeconomic spectrum. The resulting sample selection bias would thus attenuate the human capital gap between the religions. Therefore, the so-called "Catholic effect" we report in our regressions is an underestimate of the true effect.

3.4. Religion and Human Capital in Ireland

Research linking religion and economic development in Ireland is surprisingly scarce. Writing over a century ago, former Unionist politician and Irish cooperative pioneer Horace Plunkett, expressed a distinctly Weberian-like sentiment—pointing to the economic shortcomings of Irish Catholicism, and positing 'a defect in the industrial character' of its adherents (Plunkett, 1905, pp. 101–102). Soon after, Catholic priest

Michael O'Riordan (1906) penned a comprehensive rebuke, but ultimately religious sensitivities appear to have curtailed further exchange in the ensuing decades. More recently, however, this debate has been renewed, with evidence presented which downplays Plunkett's views, and instead points to the lack of economic difference between Irish Catholics and Protestants (Akenson, 1988). Furthering this debate, our analysis highlights a residual gap between Catholics and Protestants even after controlling for socioeconomic status and geography, and thus suggesting economic differences, however caused, did exist between the two Christian denominations. In the discussion which follows, we consider the possible reasons why religion may have been an important determinant in human capital variation in Ireland at the turn of the twentieth century.

According to the 1911 census, Roman Catholics made up a significant majority of the Irish population, with 3.24 million persons (73.9 per cent) returned as adherents of the Roman Catholic Church. Beyond this, Protestants represented a substantial minority, albeit composed of a variety of different denominations. These included Anglicans (the Church of Ireland) and Presbyterians, who represented the largest Protestant groups, with 576,611 (13.1 per cent) and 440,525 (10.0 per cent) adherents respectively, a smaller group of Methodists, numbering 62,382 (1.4 per cent), as well as other minor denominations. Although not perfectly correlated, these religious divisions bore some consistency with socioeconomic status. Anglicans in particular dominated the highest echelons in society—owning the largest land estates and being significantly overrepresented in the highest occupational categories (Campbell, 2009; see also chapter 2). Below them, Presbyterians, were concentrated in Ulster, where they held the largest and most profitable farms in the countryside, and in the towns were overrepresented in the skilled workforce and in middle-class occupational

pursuits (Connolly, 1985, p. 4). While Catholics, at least partially due to the economic barriers which constrained their advancement, were disproportionately represented in the lowest echelons of society (Akenson, 1988).

In human capital terms, the differences which existed between the denominations in 1911 is effectively conveyed in figure 3.1, where illiteracy by religious affiliation is presented by province. This reveals, in particular, a striking dichotomisation between Catholics and adherents of the main Protestant denominations. Yet, we cannot attribute this gap directly to religion as there exist a number of confounding factors which may spuriously link religion and human capital. However, given that our dataset relates to a substantial sample of the Irish population, it is sufficiently detailed to effectively capture these offsetting factors, and thus to delineate more precisely the possible causal pathway between religion and human capital. Indeed, that is a central objective of this study: to determine, after controlling for confounding biases, whether a residual human capital gap remains between Catholics and Protestants.

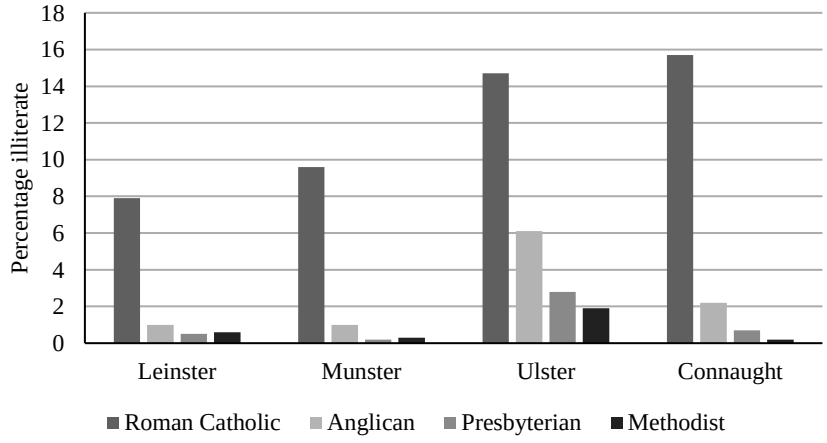

Figure 3.1. *Provincial illiteracy by religion in 1911*

Notes: Of the population 9 years old and upwards.

Source: Census of Ireland, 1911 (P.P. 1912–13, CXVIII), pp. 44–45.

The first reason why we may observe differences between Catholics and

Protestants in Ireland even after controlling for underlying socioeconomic factors is because of the intergenerational persistence of human capital inequality. Historically, the human capital difference between Catholics and Protestants, at least in terms of literacy, was even more pronounced than observed in the census returns of 1911.[35] Indeed, as shown in figure 3.2, the magnitude of the gap between Catholics and Protestants fell sharply in the decades prior to 1911. Hence, the Catholics present in our sample were disproportionately raised in homes with lower parental human capital and socioeconomic status, thus arguably reducing their means and motivations for human capital accrual. In the specific case of age heaping, this has particular resonance, because if parents are unsure of a child's age or place less emphasis on age in the home this possibly creates age uncertainty or attaches less importance to age, and thereby increases rounding propensity.

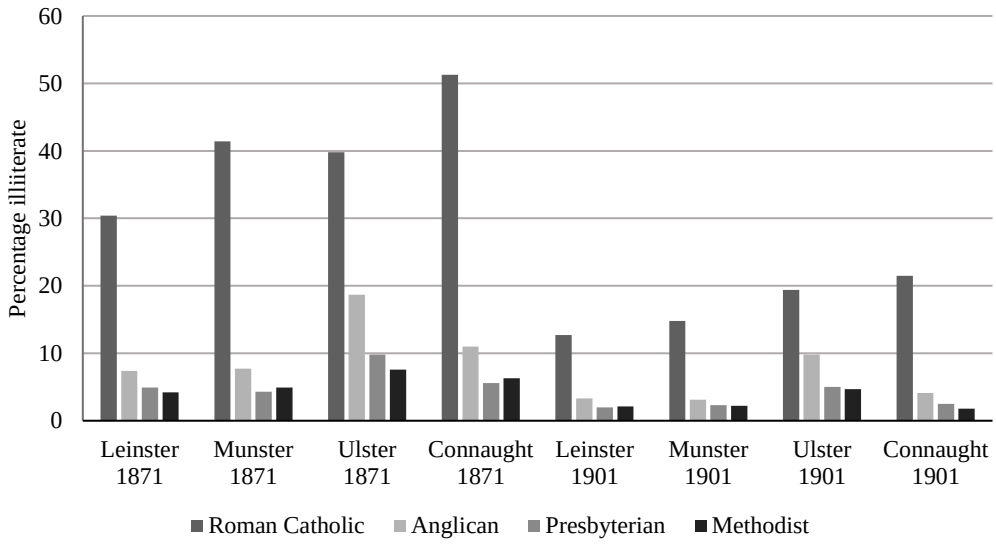

Figure 3.2. *Provincial illiteracy by religion in 1871 and 1901*

Notes: Of the population 5 years old and upwards.

Source: Census of Ireland, 1901 (P.P. 1902, CXXIX), p. 151.

Relatedly, occupational differences between the denominations may also have

[35] However, Cormac Ó Gráda has pointed out that analysis he has done for Antrim in 1851 suggests a lack of difference between the Whipple index value for Catholics and Protestants. This is perhaps an interesting puzzle for future research.

contributed to the incentives to accrue reading, writing, and numerical skills. Catholics were underrepresented in more advanced occupations,[36] and thus it is plausible their incentives to acquire human capital were lower than their non-Catholic counterparts. Indeed, for early-modern England, Thomas (1987) suggests that the perceived need for arithmetic ability was closely aligned with occupational category. Further work by Tollnek and Baten (2012) shows that age heaping tended to be less pronounced in more professional and skilled occupations, as well as for farmers, across a selection of European countries for the early modern period. With respect to literacy, existing scholarship also underscores the role of occupational opportunities. For example, Ó Ciosáin (1997, p. 27) suggests that from the mid-eighteenth century increasing tillage and textile production increased demand for literacy in Ireland in a number of ways including through the increasing use of commercial paperwork, greater use of paper currency, and the enhanced means and motivations for parents to educate their children. Furthermore, Fitzpatrick (1990, pp. 170–172), commenting on the 1871 Irish census, suggests that more employment opportunities for work among young teenagers was related to weaker school attendance and literacy.

Religious differences in human capital may also have arisen through the distinct cultural boundaries which separated the Catholic and Protestant populations. These emanate from the diffusion of Protestantism to Ireland predominantly via British settlement from the latter half of the sixteenth century, which resulted in the religious organisation of Irish society along cultural lines. Indeed, by the nineteenth century Catholic-Protestant dichotomisation had become increasingly pronounced with separation in a variety of domains such as politics, sport, education, and industry.[37] In

[36] See table 2.7.

[37] For further perspective on the roots of the dichotomisation between Catholics and Protestants see section 2.3.

human capital terms, the significance of such division, especially for age heaping, is conveyed in Ó Gráda's (2006) study of Dublin's immigrant Jewish population, which highlights differences in the age-heaping propensity and broader demographic characteristics of Jews relative to their non-Jewish neighbours. Moreover, further work by Ó Gráda (1985) and Budd and Guinnane (1991) demonstrates a greater heaping propensity among Irish Catholics, and suggests they may have been more dishonest or careless in declarations about their age relative to their peers.

These cultural boundaries were further amplified with the organisation of schooling along religious lines. For while the early introduction of a National System of Education in 1831 had promised a mixed education, these aspirations were eroded by denominational desires to extend influence from the Church to the classroom (Coolahan, 1981, pp. 3–19). Indeed, between 1881 and 1912 the percentage of children attending National Schools with both Roman Catholic and Protestant pupils fell from 55.1 per cent to 27.9 per cent (Durcan, 1972, p. 22), while perhaps more tellingly, by 1900 just 4.9 per cent of Protestant children were taught by a Catholic teacher, and less than 1 per cent of Catholic children by a Protestant teacher (Daly, 1981, p. 116). Even so, the implementation of the National System of Education, together with the later Powis Commission reforms in 1870, did play an important role in the diffusion of basic educational skills throughout the population (Logan, 1990), with Catholics arguably the chief beneficiaries. Indeed, Akenson (1970, pp. 384–385) suggests that the financial savings and patronage accrued from the National System, was most advantageous to the Roman Catholic Church simply because it had the largest number of school-aged members. In human capital terms Catholics benefited too as shown in figure 3.2, with illiteracy falling from 39.9 per cent in 1871 to 16.4 per cent in 1901, as compared to changes from 14.2 per cent to 7.3 per cent, and from 9.6 per cent to 4.9

per cent, for Anglicans and Presbyterians respectively over the same period. Yet, given the religious boundaries it entrenched, if not advanced, ultimately the role of the National System in perpetuating cultural differences remains a plausible factor in human capital variation.

A further consideration is the continuous demographic change which occurred due to emigration in the decades prior to 1911 (the year utilised here for the analysis). Fitzpatrick (1984, p. 3) suggests that between 1855 and the First World War, approximately four million persons emigrated from Ireland, raising questions about whether such population decline unevenly affected the human capital of the main religious denominations. Unfortunately for our analysis, however, Akenson (1988, p. 198) suggests that the propensity of specific religious groups to emigrate cannot be directly ascertained, although he also contends that from what can be inferred there does not appear to be a significant difference between the groups. Nevertheless, the general characteristics of emigration merit attention. Firstly, post-Famine emigrants, unlike their predecessors, tended to be young, single adults (Guinnane, 1997, pp. 104–105). Indeed, if the 1891 emigration statistics are taken as an indication of this, then 64.6 per cent of emigrants were aged from 15 years to under 25 years, and 18 per cent aged from 25 years to under 35 years. Emigration also had an important regional element in the late-nineteenth century. At the county level, most emigrants, apart from those from north-east Ulster, were heading to the US, and came from more backward areas with 'many Irish-speakers, few Protestants, large agricultural populations, and low farm valuation *per capita*' (Fitzpatrick, 1980, p. 129). Emigrants to Britain tended to be drawn from north-east Ulster and the east and south coasts, and from less agricultural and more Protestant areas, while emigrants to Canada mainly originated in Ulster and came from more agricultural and backward counties (Fitzpatrick, 1980,

p. 130). The general conditions which precipitated emigration are highlighted in a cross-sectional, county-level analysis by Hatton and Williamson (1993), which points to poverty, low wages, larger families, and a lack of opportunity to obtain smallholdings as being associated with high rates of emigration. However, Hatton and Williamson (1993) also find little evidence of the importance of illiteracy or religion. More recent work by Connor (2016), using individual-level data, suggests that emigrants to the US were more likely to come from an intermediate wealth and skill position in Irish society, with sons of poor landholders showing a heightened propensity to emigrate vis-à-vis sons of landless labourers and wealthier landholders. Other recent work by Blum et al. (2017) suggests that migrants to England and Wales tended to be more numerate than those who remained behind. However, the important point is, at least in the context of this study, that synthesising these various findings into a mono-causal pathway is short-sighted. Rather, as Fitzpatrick (1980, p. 134) eloquently expresses in his own work, 'regional analysis has suggested something of the great diversity of economic functions which emigration could perform. Irish society was not homogenous, and neither was its emigration'. Indeed, to the best of our knowledge, no previous work has effectively investigated whether selection into emigration by human capital status differed between Catholics and Protestants. However, given the important nuances that did exist, and which were often related to geography, it seems plausible that motivations for emigration differed between Catholics and Protestants, not expressly due to religion, but rather due to the differing situations Catholics and Protestants tended to find themselves in.

A final consideration is the more "direct" effect of religion. Becker and Woessmann (2009) suggest that Protestant emphasis on reading the Bible was conducive to literacy. In Ireland, as elsewhere, Catholic mass was held in Latin up

until the mid-1960s. Therefore, Irish Catholics arguably had less incentive to read and understand the Bible compared to their Protestant counterparts. Indeed, Protestant participation in religious practice may have boosted numerical and literacy skills by encouraging Bible reading and involving congregational singing—thereby incentivising the user to read and to locate the appropriate text which was delineated numerically. As such, greater Protestant emphasis on reading the Bible may also have indirectly led to greater numerical appreciation among this part of the population. This biblical importance is especially pertinent for Presbyterianism, with its Calvinist association, which placed particular emphasis on such endeavour.

3.5. Data

Our study uses individual records from the recently digitised 1911 Irish census. These data contain the full population returns and have been used in a number of recent studies (Fernihough et al., 2015; Fernihough, 2017). While this data source provides a rich source of historical information, we must also consider its limitations and make adjustments. Research by Földvári et al. (2012) demonstrated that census-based individual records were usually completed by the household head rather than individual members. With this in mind, we restrict our sample to male household heads. Since we want to explicitly look at the Catholic-Protestant dichotomy in the Irish context, we also eliminate a small number of observations where religious affiliation lies elsewhere (like the Plymouth Brethren) and those born outside Ireland. Conventional age-heaping measures, such as the Whipple index, focus on the population aged between 23 and 62 years. The rationale for this focus is to look exclusively at the adult population and exclude older cohorts, as age-heaping propensity might be correlated with selective mortality. In other words, if those who

are more likely to age heap are also more likely to die early this may lead to the incorrect inference that older generations have higher levels of human capital.

Table 3.1 presents the summary statistics for a selected number of variables in our analysis sample. Of the 4.39 million individuals surveyed in April 1911, a large proportion (431,280) of these are contained in our analysis sample. As with the census, most of this sample are adherents of Roman Catholicism. The distribution of religious affiliations fits well with those reported in section 3.4. Most of the sample (86.8 per cent) report to be fully literate (suggesting they can both read and write). A small number (3.3 per cent) were not fully illiterate, and could read but not write. For the purpose of this study, we only use the fully literate variable as an outcome measure. Thus, the illiterate group also includes those who can and cannot read. The probability that someone is a potential "age heaper" and rounded their reported age to end in zero or five is 0.31. However, this variable is an inherently noisy measure of an individual's human capital because approximately 20 per cent of the sample should correctly declare an age that ends in zero or five. Fortunately, this does not cause any major issue in our regression analyses as the measurement error associated with a dependent variable will only cause extra noise in the error term and not bias any of the estimated coefficients. The disadvantage of this measurement error will be a loss of precision in the parameter estimates, although this concern is alleviated by the large sample size and the resulting small standard errors. Table 3.1 also reveals that the average age of the household head is 44 years, and that most individuals are married. Furthermore, around 14 per cent of the sample live in a household containing at least one domestic servant—a marker for individuals in the highest socioeconomic bracket.

Table 3.1. *Descriptive statistics for selected variables in the full sample*

Statistic	*Obs.*	*Mean*	*Std. dev.*	*Min*	*Max*
Roman Catholic	431,280	0.744	0.436	0	1
Church of Ireland	431,280	0.136	0.343	0	1
Presbyterian	431,280	0.120	0.325	0	1
Fully literate	431,280	0.868	0.339	0	1
Read only	431,280	0.033	0.180	0	1
Age heaper	431,280	0.311	0.463	0	1
Age	431,280	44.158	9.955	23	62
Married	431,280	0.821	0.383	0	1
Servant present in household	431,280	0.139	0.346	0	1

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Figures 3.3 and 3.4 illustrate the relationship between human capital and religion at the county level. These data were compiled by aggregating our analysis sample. Figure 3.3 provides a scatterplot linking the percentage of Roman Catholics in each county with literacy and then the Whipple index (indicative of age heaping) in the left and right panels respectively. Taken together, these provide a mixed picture regarding human capital and religion in Ireland. Counties with a lower share of Catholics have populations which are much less likely to age heap. This result contrasts with the literacy result, where no obvious relationship exists between the religious composition of a county and the proportion of those declaring to be literate. The patterns exhibited in figure 3.3 are also evident in figures 3.4–3.6 which show the spatial distribution of the religious denominations and the human capital indicators. This illustrates that the Protestant population of Ireland was concentrated in the North and East of the country—a legacy of these regions being the most successfully planted by the British. The literacy panel underscores the low correlation between the Catholic and literacy variables, with literacy prevalent in the southern counties despite a large proportion of the population being Catholic. The panel concerning the Whipple index (indicative of age heaping) is also in keeping with the age heaping scatterplot in figure 3.3.

Figure 3.3. *Roman Catholicism, literacy, and age heaping by county*

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

If the religious composition of an area is uncorrelated with literacy it does not necessarily mean that no relationship exists at the individual level. That individual-level relationships can be obscured in aggregated data is a well-known problem in social science research and is termed ecological fallacy. For example, in US politics while income is positively correlated with the propensity to vote for the Democratic Party at the state level, at the individual level wealthier people are more likely to vote for the Republican Party. Consequently, it is always best for researchers to use either individual data, or, if individual data are unavailable, data that have been aggregated at the smallest unit possible when inferring relationships at the individual level. The importance of ecological fallacy in economic history research has been emphasised by Brown and Guinnane (2007), and more recently in the Irish case by Fernihough (2017). Our data are based at the individual level, and thus are the first to measure the link between Protestantism and human capital in a historical context using micro data for a large number of data points.

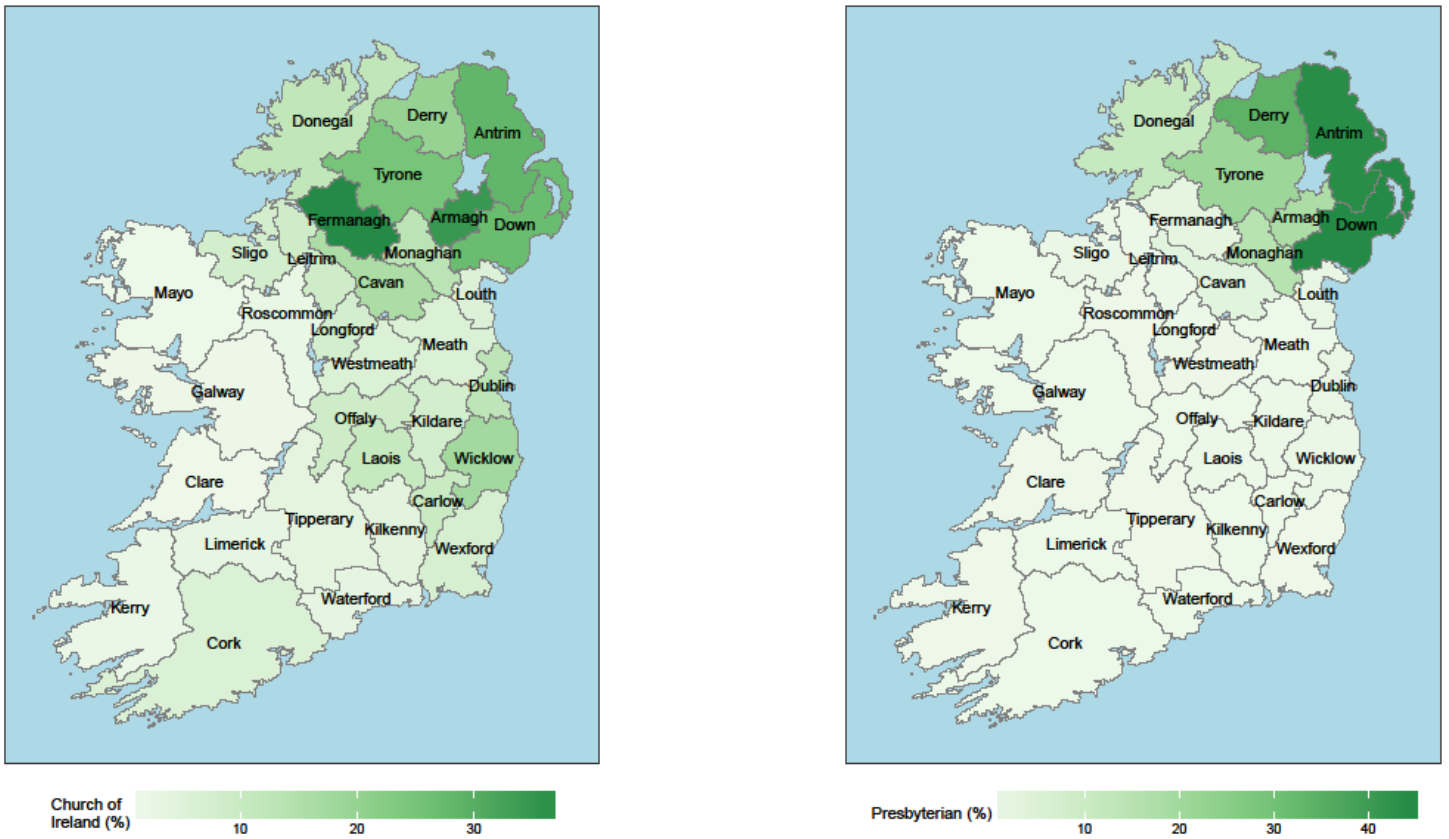

Figure 3.4. *Percentage of adherents of the Church of Ireland (Anglicans) and Presbyterianism by county*

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Figure 3.5. *Percentage of adherents of Roman Catholicism by county*

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

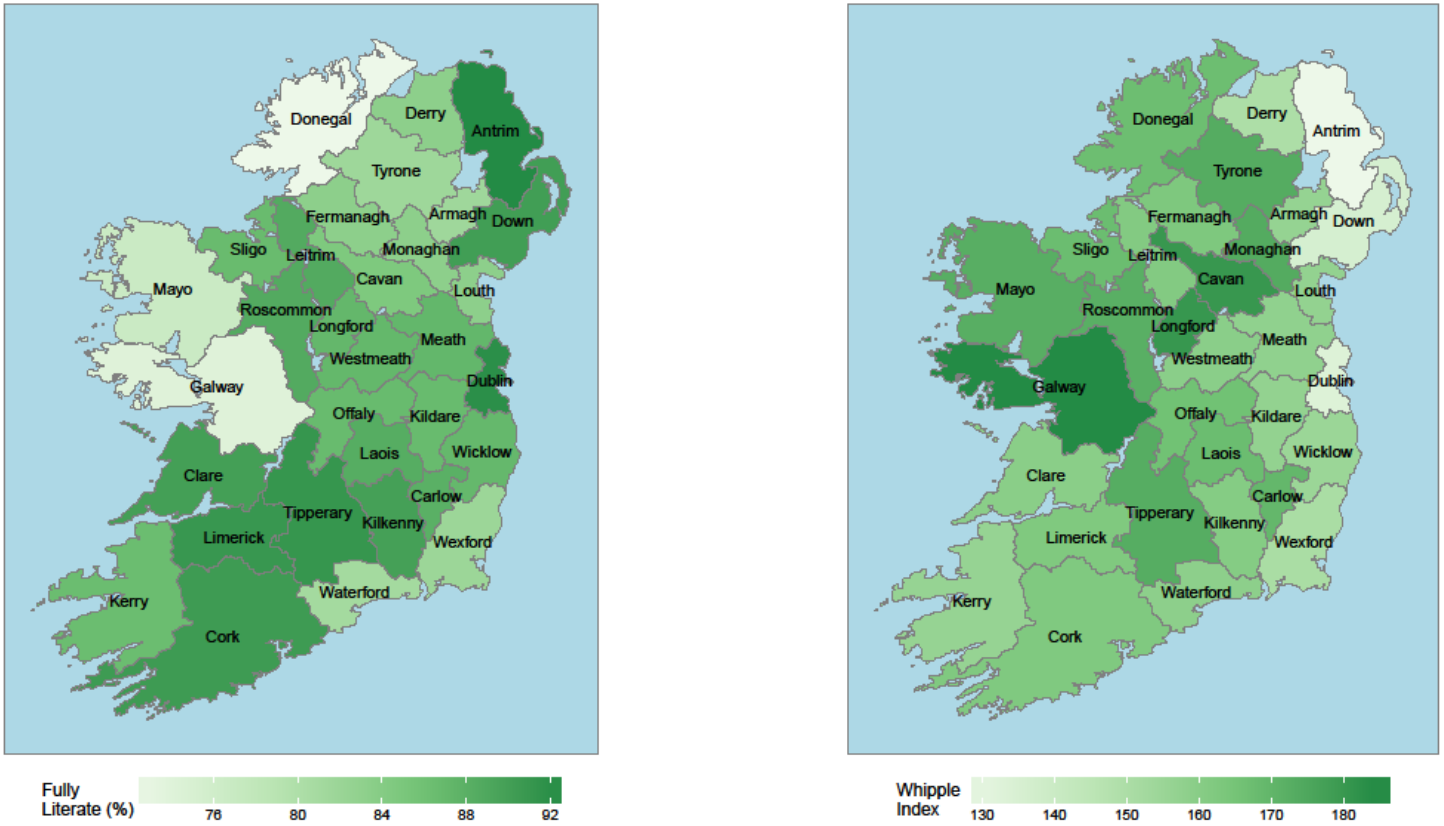

Figure 3.6. *Fully literate and Whipple index by county*

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

3.6. Empirical Analysis

In this section, we report regression results from variations of the following linear probability model:

$$y_i = \alpha + \beta_1 COI_i + \beta_2 Pres_i + X_i\gamma + \epsilon_i$$

where $y_i \in \{0, 1\}$ is the human capital outcome of interest (person i is an age heaper or fully literate), the β_k coefficient measures the strength of the conditional relationship between individual i being an adherent of Anglicanism or Presbyterianism (compared to the Roman Catholic reference group) and y_i, and X_i contains control variables which vary across the model specifications. The α and ϵ_i terms represent the intercept and idiosyncratic error terms respectively. We use a linear probability model (LPM) estimated via ordinary least squares (OLS) instead of binary response models such as Probit or Logit. The LPM offers a number of advantages in this application. The most important of these is that it allows us to include a large number of control variables estimated as fixed effects without running into the incidental parameter problem or making the estimation procedure computationally infeasible. We deal with the issue of heteroskedasticity (and spatial autocorrelation) by adjusting all variance-covariance estimates for clustering at the district electoral division (DED) level.[38]

Table 3.2 displays our initial results where we regress literacy on a selection of explanatory variables. The reported covariate figures are point estimates and can be interpreted as marginal effects. We use 95 per cent confidence intervals to measure uncertainty in our point estimates. These confidence intervals are based upon standard errors clustered at the DED level as detailed previously. Each of the columns represent

[38] The DED is a geographical administrative unit. There were 3,655 DEDs in Ireland in 1911.

alternative specifications: the first models the association between the main Protestant denominations and literacy without any further control variables, the second introduces age, and county-level fixed effects, while the latter columns include marital status, servant presence, and other fixed effects. We control for marital status and servant presence in the latter specifications as success in the marriage market may be driven by human capital attainment, and the presence of a servant may proxy for socioeconomic status. We also extend on the county-level fixed effects employed in specification 2, adding DED, and street-level fixed effects, to control for geographic variation at the most detailed resolution possible, HISCO fixed effects (van Leeuwen et al., 2002) to control for occupational stratification,[39] and surname fixed effects that potentially control for shared historical roots across individuals. The benefit of using a variety of fixed effects is that we are able to disentangle more precisely the specific causal contribution of religion as distinct from other confounding factors.

One concern with the estimation strategy outlined is that some of these covariates might actually be outcomes from improved literacy. For example, a greater number of occupations are open to literate individuals compared to their illiterate counterparts. This is not an unreasonable criticism. However, by controlling for as many potential offsetting influences as possible we can try to get as close as is achievable to the true causal effect of religion on literacy. Regardless, if the inclusion of these controls does create a bias, this bias is towards the null so our results are a potential lower bound on the true effects.

Turning to the point estimates in table 3.2, we see consistent evidence that

[39] Although Ireland's historical occupations have not been classified by the HISCO project, we match these occupations to the corresponding HISCO codes for Great Britain. A complete repository of the HISCO project's occupational coding can be found at the following url: http://hisco.antenna.nl/.

adherents of the main Protestant denominations, Anglicans and Presbyterians, were more likely to be fully literate than their Roman Catholic counterparts. From specification 3 on, where both occupational and geographic fixed effects are included, the magnitude of the point estimates suggests a gap of at least 4.6 per cent between Catholics and Anglicans, and of at least 8.3 per cent between Catholics and Presbyterians. The narrow confidence intervals point to precision in the estimated effect. As expected, the marriage and servant presence covariates are positive, signifying that these characteristics are positively associated with being fully literate.

Table 3.3 reveals a similar pattern. Dividing the sample into two age cohorts, Anglicans and Presbyterians whether "younger" or "older" were more likely to be fully literate than their Catholic counterparts. Yet, for both Protestant groups the magnitude of the coefficient is lower in the younger cohort, suggesting an amelioration of Catholic literacy disadvantage over time. Even so, the differences of 3.6 per cent and 6.4 per cent for Anglicans and Presbyterians relative to Roman Catholics in the younger cohort are economically sizeable and suggest religious disadvantage persisted at least well into the latter half of the nineteenth century. These results also help to alleviate concerns that the introduction of the old-age pension may have promoted age exaggeration and thus provide a misleading picture of human capital status. For given that we find a significant economic gap in the younger cohort, where the incentives for age exaggeration were likely lower, it suggests robustness in the revealed religious disparity.

Tables 3.4 and 3.5 mirror the approach adopted in tables 3.2 and 3.3, but with age heaping as the dependent variable as opposed to literacy. Again we see consistent evidence that Anglicans and Presbyterians had superior human capital relative to

Roman Catholics, with the negative point estimates indicative of reduced heaping propensity. With the inclusion of both geographic and occupational fixed effects from specification 3 onwards in table 3.4, the magnitude of the point estimate is relatively stable, and reveals a reduced heaping propensity of approximately 3.4 to 4 per cent among Anglicans and Presbyterians, with noticeably little difference between these Protestant denominations. This interesting result suggests that Catholic-Protestant cultural differences may have been the main driver of age-heaping propensity, but that further religious nuances affected literacy, where there was more obvious intra-Protestant variation. Table 3.5, similar to literacy disaggregated into age cohorts, suggests that Protestants in the younger cohort were less likely to age heap than their older counterparts vis-à-vis the analogous Catholic population.

Tables 3.6 and 3.7 disaggregate the population into various subsamples to examine the robustness of the religious gap in a range of settings. Specifications 1 and 2 subdivide the population by the alternative human capital characteristic: literacy or age heaping. This helps to reveal the degree of substitutability of the indicators, as well as addressing concerns that we have not fully captured socioeconomic differences. Similarly, specifications 3 and 4 ameliorate concerns about controlling adequately for underlying social status by dividing the population by servant presence. To some extent, servant presence may reflect a more exclusive social strata with 14 per cent of the population having a servant present in the household in 1911. In the final specifications (5 and 6), the population is divided into subsamples according to Roman Catholic concentration by DED. A Roman Catholic (RC) area is defined as one where the proportion of Protestants is less than 25 per cent. Here we are interested in whether there may be any cultural spill-over effects from Protestants to Catholics that could potentially mitigate religious differences. For example, this could be because Catholics

may be more likely to attend mixed schools or interact more with the Protestant population in less Catholic-dominated areas.

Turning to the point estimates, the first two specifications reveal the general persistence of a sizeable gap between Protestants and their Roman Catholic counterparts when we divide by the alternative human capital characteristic. The difference is most pronounced among those who are in each of the lower human capital groups (illiterates and age heapers), although Presbyterianism is statistically insignificant when age heaping is the dependent variable for the illiterate group. In specifications 3 and 4, where the population is then divided by servant presence, we again see that Protestants were less likely to be illiterate and age heap in the various subsamples. This gap tends to be largest among those with no servants. For those with a servant present, there are some signs of less statistical significance, with Anglicanism insignificant when literacy is the dependent variable, and Presbyterianism insignificant when age heaping is the dependent variable. In the final specifications, where the population is divided into subsamples according to Roman Catholic concentration by area, the results reveal that in more Catholic-concentrated areas the gap between Roman Catholics and Protestants tends to be larger. This difference may provide some support for the notion that human capital is not only commensurate with individual religious affiliation, but may be affected by spillover effects from community religious externalities such as Catholic children benefiting from mixed schools in less Catholic-concentrated areas. An alternative explanation would be that the small closing of this gap is actually a selection effect, whereby Catholics willing to live in more Protestant-concentrated areas differ from Catholics elsewhere in Ireland. Regardless, the fact that the human capital gap persists in the large majority of these samples is consistent with the notion that religion is an important determinant of human capital.

Tables 3.8 and 3.9 take a similar approach to the specifications followed in tables 3.2 and 3.4, but adopt an instrumental variable strategy to confirm the causal patterns identified. Focus is directed to Roman Catholicism, which is instrumented using the logged distance to the nearest British port, in line with related studies which also use a distance approach (Becker and Woessmann, 2009; Boppart et al., 2013, 2014; Cantoni, 2015). In this case, we expect that the minimum distance from an active British port (Daniell, 2014) in the early modern period will reflect the extent of Protestant diffusion from Britain, with Protestant concentration greatest in more adjacent regions. We omit the geographic fixed effects as these are strongly correlated with our distance measure and reduce the power of the first-stage F-statistic. However, given the inclusion of HISCO and surname fixed effects, we expect that our specification still captures regional variation.

Implementing the instrumental variable approach yields results which are comparable to the OLS estimates. For literacy, the point estimate is more negative than the original estimate (this table is not reported), and the confidence interval wider—indicative of greater estimate uncertainty. Yet, given the lack of geographic fixed effects and the proxy for Catholicism the instrument provides, the 2SLS results appear in line with those obtained from the OLS model. Similarly for age heaping, the point estimates are inflated, although more so than for literacy. Again, this may reflect the substitution of Catholicism with the instrument, and the lack of geographic fixed effects—meaning less variation is accounted for as suggested by the reduced R-squared values. Overall this exercise, in both cases, raises the gap between Catholics and Protestants, and thus underlines the religious dichotomy we infer from the OLS model. Our instrumental variable estimates suggest firstly that the dichotomy is caused by religion as opposed to omitted factors. Secondly, the tables indicate that the effect

of Catholicism on human capital might be larger than is estimated in the OLS regressions.

Table 3.10 provides a summary of the human capital status of Irish persons at home and abroad. This reveals that Irish persons at home, whether Catholic, Anglican, or Presbyterian, tended to be less literate than their counterparts in either the US or Canada. This is particularly striking when we consider that Catholics had a greater propensity to emigrant to the US, where literacy is even higher than for Presbyterian persons at home. For age heaping, there are also obvious differences between the Irish at home and abroad. Irish persons living in England and Wales have particularly low levels of age heaping when compared with both Catholics and Protestants in Ireland, while even for the US, which has the highest levels of age heaping abroad, there is still an obvious advantage over Irish Catholics. While we cannot precisely distinguish between Catholics and Protestants abroad, these statistics do suggest that it was those with higher levels of human capital that had disproportionately departed Ireland. These differences are important because if there is a greater propensity for the brightest to leave the island then there is potentially a "brain drain" effect within the population. Moreover, there are important questions to be asked about how human capital interacted with other factors to motivate migration. Indeed, in the particular case of religion, were there potentially differences between Catholics and Protestants in terms of selection by human capital that can explain the gap in the early twentieth century? Future research is required to disentangle more precisely this connection between religion, migration, and human capital, but it is plausible that the gap between the religions may be at least partially attributable to migration tendencies.

Table 3.2. *Observation is fully literate: OLS results*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Church of Ireland	0.065***	0.091***	0.061***	0.049***	0.046***
	(0.058, 0.073)	(0.084, 0.097)	(0.055, 0.066)	(0.044, 0.054)	(0.040, 0.052)
Presbyterian	0.098***	0.140***	0.107***	0.087***	0.083***
	(0.090, 0.105)	(0.130, 0.150)	(0.098, 0.115)	(0.079, 0.094)	(0.075, 0.091)
Age		0.016***	0.006**	0.003	0.002
		(0.010, 0.022)	(0.001, 0.011)	(-0.002, 0.009)	(-0.004, 0.008)
$Age^2/100$		-0.043***	-0.022***	-0.016**	-0.014*
		(-0.056, -0.029)	(-0.035, -0.010)	(-0.030, -0.002)	(-0.028, 0.001)
$Age^3/1{,}000$		0.003***	0.002***	0.001**	0.001*
		(0.002, 0.004)	(0.001, 0.003)	(0.0001, 0.002)	(-0.0001, 0.002)
Married			0.016***	0.020***	0.019***
			(0.013, 0.019)	(0.016, 0.023)	(0.016, 0.023)
Servant present in household			0.067***	0.048***	0.047***
			(0.063, 0.070)	(0.045, 0.051)	(0.043, 0.050)
County FE	No	Yes	No	No	No
DED FE	No	No	Yes	No	No
Street FE	No	No	No	Yes	Yes
HISCO FE	No	No	Yes	Yes	Yes
Surname FE	No	No	No	No	Yes
Observations	431,280	431,280	431,280	431,280	431,280
R-squared	0.011	0.049	0.112	0.278	0.322
Adjusted R-squared	0.011	0.048	0.111	0.178	0.182
Residual std. error	0.337	0.330	0.319	0.307	0.306

Notes: Linear probability model regressing literacy on indicated covariates and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.3. *Observation is fully literate: OLS results stratified by age cohort*

	(1)	*(2)*	*(3)*	*(4)*
Church of Ireland	0.050***	0.081***	0.036***	0.057***
	(0.043, 0.056)	(0.071, 0.090)	(0.029, 0.043)	(0.047, 0.067)
Presbyterian	0.079***	0.118***	0.064***	0.102***
	(0.073, 0.085)	(0.110, 0.127)	(0.055, 0.073)	(0.090, 0.114)
Age			-0.002	-0.009
			(-0.005, 0.001)	(-0.020, 0.002)
$Age^2/100$			-0.002	0.005
			(-0.006, 0.003)	(-0.005, 0.015)
Married			0.014***	0.023***
			(0.009, 0.019)	(0.017, 0.029)
Servant present in household			0.039***	0.054***
			(0.035, 0.043)	(0.048, 0.059)
Age sample	45 and under	Over 45	45 and under	Over 45
Street FE	No	No	Yes	Yes
HISCO FE	No	No	Yes	Yes
Surname FE	No	No	Yes	Yes
Observations	236,322	194,958	236,322	194,958
R-squared	0.009	0.014	0.389	0.440
Adjusted R-squared	0.009	0.014	0.172	0.191
Residual std. error	0.303	0.371	0.277	0.336

Notes: Linear probability model regressing literacy on indicated covariates and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.4. *Observation with age ending in either 0 or 5: OLS results*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Church of Ireland	-0.062***	-0.053***	-0.038***	-0.034***	-0.035***
	(-0.067, -0.057)	(-0.058, -0.049)	(-0.043, -0.033)	(-0.040, -0.028)	(-0.043, -0.028)
Presbyterian	-0.062***	-0.049***	-0.040***	-0.035***	-0.037***
	(-0.069, -0.055)	(-0.054, -0.043)	(-0.045, -0.034)	(-0.041, -0.028)	(-0.045, -0.029)
Age		-0.173***	-0.154***	-0.148***	-0.157***
		(-0.209, -0.136)	(-0.191, -0.118)	(-0.190, -0.106)	(-0.201, -0.114)
$Age^2/100$		0.687***	0.624***	0.601***	0.636***
		(0.553, 0.821)	(0.491, 0.758)	(0.448, 0.753)	(0.477, 0.795)
$Age^3/1{,}000$		-0.113***	-0.104***	-0.100***	-0.106***
		(-0.135, -0.092)	(-0.125, -0.083)	(-0.124, -0.076)	(-0.131, -0.081)
$Age^4/100{,}000$		0.067***	0.062***	0.060***	0.063***
		(0.055, 0.079)	(0.050, 0.074)	(0.046, 0.074)	(0.048, 0.078)
Married			-0.026***	-0.025***	-0.025***
			(-0.030, -0.022)	(-0.030, -0.021)	(-0.030, -0.020)
Servant present in household			-0.012***	-0.012***	-0.011***
			(-0.016, -0.008)	(-0.017, -0.006)	(-0.016, -0.005)
County FE	No	Yes	No	No	No
DED FE	No	No	Yes	No	No
Street FE	No	No	No	Yes	Yes
HISCO FE	No	No	Yes	Yes	Yes
Surname FE	No	No	No	No	Yes
Observations	431,280	431,280	431,280	431,280	431,280
R-squared	0.003	0.010	0.016	0.144	0.191
Adjusted R-squared	0.003	0.010	0.015	0.025	0.024
Residual std. error	0.462	0.460	0.459	0.457	0.457

Notes: Linear probability model regressing "age heaping" on indicated covariates and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.5. *Observation with age ending in either 0 or 5: OLS results stratified by age cohort*

	(1)	*(2)*	*(3)*	*(4)*
Church of Ireland	-0.057***	-0.069***	-0.027***	-0.034***
	(-0.064, -0.051)	(-0.075, -0.063)	(-0.037, -0.017)	(-0.046, -0.023)
Presbyterian	-0.059***	-0.067***	-0.030***	-0.034***
	(-0.068, -0.050)	(-0.075, -0.058)	(-0.041, -0.018)	(-0.048, -0.020)
Age			-5.549***	189.941***
			(-5.911, -5.186)	(184.846, 195.037)
$Age^2/100$			26.047***	-525.499***
			(24.431, 27.664)	(-539.706, -511.291)
$Age^3/1{,}000$			-5.350***	64.421***
			(-5.665, -5.034)	(62.666, 66.175)
$Age^4/100{,}000$			4.061***	-29.526***
			(3.833, 4.289)	(-30.336, -28.716)
Married			-0.027***	-0.018***
			(-0.034, -0.020)	(-0.025, -0.012)
Servant present in household			-0.014***	-0.010**
			(-0.023, -0.006)	(-0.018, -0.001)
Age sample	45 and under	Over 45	45 and under	Over 45
Street FE	No	No	Yes	Yes
HISCO FE	No	No	Yes	Yes
Surname FE	No	No	Yes	Yes
Observations	236,322	194,958	236,322	194,958
R-squared	0.003	0.004	0.324	0.405
Adjusted R-squared	0.003	0.004	0.084	0.141
Residual std. error	0.466	0.456	0.447	0.424

Notes: Linear probability model regressing "age heaping" on indicated covariates and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.6. *Observation is fully literate: OLS results for population subsamples*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Church of Ireland	0.062***	0.040***	0.051***	0.008	0.023***	0.047***
	(0.049, 0.075)	(0.034, 0.046)	(0.044, 0.057)	(-0.003, 0.019)	(0.007, 0.038)	(0.041, 0.053)
Presbyterian	0.102***	0.072***	0.087***	0.028***	0.052***	0.094***
	(0.086, 0.119)	(0.064, 0.080)	(0.079, 0.096)	(0.013, 0.042)	(0.038, 0.067)	(0.084, 0.104)
Subsample	Age-heaper	Non-age-heaper	No servants	Servants	Non-RC area	RC area
Full controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,947	297,333	371,123	60,157	61,260	370,020
R-squared	0.508	0.360	0.333	0.697	0.317	0.331
Adjusted R-squared	0.189	0.173	0.179	0.237	0.158	0.180
Residual std. error	0.337	0.291	0.322	0.150	0.251	0.315

Notes: Linear probability model regressing literacy on indicated covariates and an omitted constant term. The 'age-heaper' sample is those who have indicated an age ending in zero or five. The 'servants' sample includes observations wherein a servant is present in the household. An 'RC area' is one where the Protestant population is less than 25 per cent. Full controls indicates that the model includes all covariates from the regression shown in column 5 of table 3.2. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.7. *Observation with age ending in either 0 or 5: OLS results for population subsamples*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Church of Ireland	-0.030***	-0.051**	-0.036***	-0.044***	-0.023**	-0.039***
	(-0.037, -0.022)	(-0.100, -0.002)	(-0.044, -0.028)	(-0.077, -0.010)	(-0.043, -0.003)	(-0.047, -0.030)
Presbyterian	-0.029***	-0.044	-0.039***	-0.017	-0.031***	-0.036***
	(-0.038, -0.021)	(-0.102, 0.013)	(-0.049, -0.030)	(-0.059, 0.025)	(-0.051, -0.011)	(-0.047, -0.025)
Subsample	Literate	Illiterate	No servants	Servants	Non-RC area	RC area
Full controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	374,312	56,968	371,123	60,157	61,260	370,020
R-squared	0.207	0.565	0.208	0.588	0.197	0.202
Adjusted R-squared	0.021	-0.042	0.024	-0.037	0.011	0.022
Residual std. error	0.452	0.500	0.458	0.464	0.435	0.461

Notes: Linear probability model regressing "age heaping" on indicated covariates and an omitted constant term. The 'servants' sample includes observations wherein a servant is present in the household. An 'RC area' is one where the Protestant population is less than 25 per cent. Full controls indicates that the model includes all covariates from the regression shown in column 5 of table 3.4. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.8. *Observation is fully literate: IV results*

	(1)	*(2)*	*(3)*	*(4)*
Roman Catholic	-0.061***	-0.045***	-0.039***	-0.077***
	(-0.082, -0.040)	(-0.065, -0.025)	(-0.054, -0.024)	(-0.101, -0.052)
Age		0.016***	0.006**	0.005*
		(0.010, 0.022)	(0.001, 0.012)	(-0.001, 0.011)
$Age^2/100$		-0.045***	-0.023***	-0.020***
		(-0.058, -0.031)	(-0.036, -0.010)	(-0.034, -0.007)
$Age^3/1{,}000$		0.003***	0.002***	0.002***
		(0.002, 0.004)	(0.001, 0.003)	(0.0005, 0.003)
Married			0.016***	0.017***
			(0.013, 0.020)	(0.013, 0.020)
Servant present in household			0.085***	0.072***
			(0.080, 0.089)	(0.068, 0.075)
HISCO FE	No	No	Yes	Yes
Surname FE	No	No	No	Yes
First-stage cluster adjusted F-statistic	246.876	103.062	122.05	71.159
Observations	431,280	431,280	431,280	431,280
R-squared	0.010	0.020	0.087	0.151
Adjusted R-squared	0.010	0.020	0.086	0.105
Residual std. error	0.337	0.335	0.324	0.320

Notes: IV regressions of literacy on Roman Catholicism instrumented by logged distance to the nearest British port, indicated covariates, and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.9. *Observation with age ending in either 0 or 5: IV results*

	(1)	*(2)*	*(3)*	*(4)*
Roman Catholic	0.110***	0.096***	0.070***	0.115***
	(0.099, 0.122)	(0.086, 0.106)	(0.062, 0.078)	(0.095, 0.134)
Age		-0.174***	-0.153***	-0.163***
		(-0.210, -0.138)	(-0.190, -0.117)	(-0.200, -0.125)
$Age^2/100$		0.693***	0.621***	0.657***
		(0.560, 0.827)	(0.488, 0.755)	(0.519, 0.795)
$Age^3/1{,}000$		-0.114***	-0.104***	-0.109***
		(-0.136, -0.093)	(-0.125, -0.082)	(-0.131, -0.088)
$Age^4/100{,}000$		0.068***	0.062***	0.065***
		(0.055, 0.080)	(0.049, 0.074)	(0.052, 0.078)
Married			-0.026***	-0.026***
			(-0.030, -0.022)	(-0.030, -0.022)
Servant present in household			-0.012***	-0.009***
			(-0.016, -0.007)	(-0.013, -0.004)
HISCO FE	No	No	Yes	Yes
Surname FE	No	No	No	Yes
First-stage cluster adjusted F-statistic	246.876	85.89	104.633	61.003
Observations	431,280	431,280	431,280	431,280
R-squared	0.001	0.006	0.014	0.062
Adjusted R-squared	0.001	0.006	0.013	0.012
Residual std. error	0.462	0.461	0.460	0.460

Notes: IV regressions of "age heaping" on Roman Catholicism instrumented by logged distance to the nearest British port, indicated covariates, and an omitted constant term. DED cluster-robust 95 per cent confidence intervals in parentheses. Statistical significance is indicated by asterisking as follows: *** p<0.01, ** p<0.05, * p<0.1.

Source: Census of Ireland, 1911. See Fernihough et al. (2015) where the same source is used for further description.

Table 3.10. *Irish at home and abroad*

	Ireland (RC)	*Ireland (COI)*	*Ireland (Pres)*	*England and Wales*	*US*	*Canada*
Literate	0.868	0.913	0.945	–	0.965	0.971
Whipple index	163.192	131.954	131.871	117.566	148.893	143.703
Observations	320,899	58,782	51,937	78,956	2,982	929
Population sample (%)	100	100	100	100	1	5

Notes: RC = Roman Catholics; COI = Church of Ireland (Anglicans); Pres = Presbyterians.

Sources: Census of Ireland, 1911 (see Fernihough et al. (2015) where the same source is used for further description). England and Wales: see reference 'Schurer, K., Higgs, E.' under the heading 'UK Data Service' in the reference section, https://discover.ukdataservice.ac.uk/catalogue?sn=7481, http://icem.data-archive.ac.uk; US and Canada: see references under the heading 'NAPP (North Atlantic Population Project)' in the reference section, https://www.nappdata.org/.

3.7. Conclusion

Overall, our analysis shows that there was a substantial difference in human capital between Catholics and Protestants in early twentieth-century Ireland. This difference is evident in simple comparisons between these two groups, and through empirical analysis we have attempted to explore how robust this difference is to more complex models that more closely resemble quasi-experimental methods. In our preferred specification, we are able to control for a large degree of confounding variation by including street-level, occupation, and surname fixed effects. However, despite this very precise model specification, the sizeable difference between the religions remains intact. To further verify this result, we follow others in the existing literature and employ a distance-based measure that exploits geographical variation in Protestant diffusion to instrument for Catholicism. Once again, the Catholic-Protestant dichotomy is preserved.

Our results align well with others in the existing literature who have proposed human capital as an important channel through which religion influences economic development (Becker and Woessmann, 2009). In the Irish case, this may be related to the intergenerational transmission of cultural differences, which historically differentiated Catholics and Protestants, leading to variation in human capital status among those in a subsequent generation who (largely) differ only by religion. In addition, the difference between Presbyterians and Anglicans for literacy, possibly also suggests that denomination did matter for human capital, beyond simply a Catholic-Protestant dichotomy, and is particularly interesting given the biblical emphasis of Presbyterianism and the role of this channel in Becker and Woessmann's (2009) analysis.

In closing, it is worth emphasising again that a central contribution of this inquiry is the use of individual-level data. Unlike previous studies, these data ensure we are not committing an ecological fallacy by spuriously connecting religion and human capital. While our results are consistent with patterns of human capital and religious affiliation elsewhere, we cannot guarantee that they generalise to other contexts. Thus, an extension of this study to other regions and other time periods would represent a worthy contribution and an interesting topic for future research.

4. An Economic Conversion? Rural Cooperative Banking in the Netherlands at the Turn of the Twentieth Century

4.1. Abstract

Cooperatively-owned Raiffeisen banks emerged in the Netherlands in the late 1890s and spread across the country. Constructing a new dataset, we investigate the determinants of their market entry and assess their early performance. We test three hypotheses for their arrival and function: (1) to meet an untapped market demand; (2) as an organisational response to agricultural change; and (3) as an extension of socioreligious pillarisation. Our results suggest that their reason for entering the market for rural financial services differed from their subsequent function. We argue that while Catholic clergy may have provided a necessary impetus for the emergence of Raiffeisen banks, ultimately the role of religion functionally transitioned to realising the economic advantages associated with the cooperative organisational form.

4.2. Introduction

In the low-growth aftermath of the 2008 Global Financial Crisis, economists are beginning to question whether banks are engines of growth or are instead harbingers of economic and social instability. By going back to the beginning of our modern banking systems, we can gain new insights into the original functions of banks. In this chapter, we explore the genesis of Dutch rural savings and loans banks to understand the original economic and societal function of one of the Netherlands' largest banks

today: the Coöperatieve Rabobank U.A.[40] Our results suggest that these new innovative financial institutions played an important role in giving farmers improved access to finance as Dutch agriculture emerged from a period of crisis and faced new capital-investment needs. However, our evidence suggests that these cooperative banks were also founded out of socioreligious rather than strictly economic concerns.

With the advancement of the nineteenth century, and in common with other parts of Europe (Polsi, 1996; Guinnane, 2001; Fälting et al., 2007; McLaughlin, 2009), the Netherlands experienced a significant growth in the formal provision of personal finance. During this period, a variety of new financial institutions emerged across the country with the aim of providing savings and loans solutions, especially to low and middle-class clientele (Deneweth et al., 2014). On the savings side, savings banks (*spaarbanken*), which had emerged already in the early-nineteenth century, were joined in the 1880s by the Post Office Savings Bank (Rijkspostspaarbank), and then from the 1890s by cooperatively-owned rural Raiffeisen banks (*boerenleenbanken*). While on the loans side, incumbents, such as pawn banks (*banken van leening*), which had existed throughout the nineteenth century, and "help banks" (*hulpbanken*), which emerged from the mid-century, were likewise accompanied by Raiffeisen banks; these new entrants had a dual savings-and-loans goal.

The increasing diversity of financial provisioning in the Netherlands at this time raises important questions about the role these new financial institutions fulfilled, and perhaps more fundamentally, why they existed in the first place. In this chapter, we address this functional puzzle from the perspective of the Raiffeisen banks, focusing on their entry propensity and early performance. Our analysis is motivated by three

[40] On the eve of the recent crisis, Rabobank was the Netherlands' third-largest retail banking group by market share, and second-largest by the number of current accounts (OECD, 2007).

hypotheses, which have been advanced in various parts of the existing literature, to explain the timing of their entry: (1) to meet untapped market demand for financial services from the unbanked and underbanked (Sluyterman et al., 1998); (2) as an organisational response to agricultural depression and technological change (Bieleman, 2008); and (3) as a means of extending and consolidating the influence of confessional, pillarised, sociopolitical organisations across Dutch society (Jonker, 1988). By considering these alternative explanations, we aim to deduce the factors that precipitated entry and to understand whether those factors influenced subsequent operational effectiveness. Indeed, existing evidence from the nineteenth century shows that early philanthropic influences on organisational innovation can quickly recede amidst the realities of the marketplace (Ó Gráda, 2008b; Perriton and Maltby, 2012), suggesting a dynamism in organisational purpose.

With this in mind, perhaps a useful starting point in conceptualising the functional debate is to distinguish between economic and non-economic explanations for the emergence of cooperatives. Kyriakopoulos (2000) emphasises on the one hand the production and transactional efficiencies accrued from cooperation, and on the other the role of social collectivism and the institutional legitimacy it garners. Yet, as Kyriakopoulos points out, both lines of thinking may be complementary and overlapping in the sense that social commonality may reduce transactional costs and improve economic efficiency. In the specific case of financial cooperatives, historical evidence tends to support the salience of both arguments. For example, Guinnane's (2001) pioneering work on German credit cooperatives points to their informational and enforcement advantages. Furthermore, Colvin and McLaughlin (2014) attribute the success of Dutch Raiffeisen banks relative to their Irish counterparts to their ability to attach onto existing religiously-associated social networks. Indeed, the

heterogeneous performance of Raiffeisen credit cooperatives throughout Europe supports the relevance of both the economic and broader social environment (Guinnane and Henriksen, 1998; Galassi, 2001; Garrido, 2007; Martinez-Soto et al., 2012).

Engaging with this dual emphasis, this chapter attempts to test the relevance of the three aforementioned hypotheses, which broadly fit into these economic and non-economic strands. To do so, we a compile a dataset using bank-level and municipality-level information collated from annual reports published by the Netherlands' Centraal Bureau voor de Statistiek, and supplement this with demographic and land-type data from other sources. We direct our attention to the years 1898, 1904, and 1909, as over this horizon the early entry of Raiffeisen banks occurs. Our investigation reveals the importance of all three explanations for the entry and early performance of Raiffeisen banks. Firstly, with respect to market demand and competition, we find that the presence of a Post Office Savings Bank branch was favourable for bank emergence, while the presence of another Raiffeisen bank was generally inhibitive to entry. We also find that the presence of incumbents was negatively associated with performance as measured by deposit growth and outreach. This may suggest that while Raiffeisen banks offered financial services to a new clientele, they also "competed" with their contemporaries for business. Secondly, in relation to the agricultural environment, we find that a greater proportion of horticultural land is negatively associated with the emergence of the first banks, perhaps reflecting a greater resilience in this sector to the agricultural crisis of the late-nineteenth century, and thus a reduced demand for credit from these farmers. We also show that for the later entry phase, bank emergence is negatively related to more land per farmer and a higher tax value per hectare, perhaps indicative of their increasing penetration into less affluent areas. Unsurprisingly for

performance, wealth, as proxied by tax value, is positively associated with account size and outreach. Finally, we find that the percentage of Roman Catholics in a municipality is positively and significantly associated with both bank age and bank presence, albeit becoming less important in the later entry phase, and not statistically significant for performance. This suggests that while Catholic influence may have been an important initial catalyst in the emergence of Raiffeisen banks, in the longer term it was less vital for sustained growth, social outreach, and operational success.

Overall, these results suggest that the existence of Raiffeisen banks, in this context at least, should be understood as a response to both social and economic demands. Yes, the agricultural crisis of the late-nineteenth century and an absence of (appropriate) incumbent financiers may have provided an economic rationale for their existence, but it seems unlikely to have been a sufficient precondition. Rather, the Catholic Church, by taking advantage of its religious network, could provide the necessary impetus for the initial diffusion phase. Then, once the banks had been established, the organisational model of Raiffeisen banks was able to benefit from efficiencies accrued from religion-related social collegiality (Colvin and McLaughlin, 2014), perhaps with the function of religion ultimately transitioning from philanthropy to economy.

4.3. Incumbents and Entrants

The arrival of Raiffeisen banks in the Netherlands at the end of the nineteenth century, and their subsequent proliferation across the country, raises the question of why these new entrants succeeded when incumbent financial-service providers already existed. Here we use statistics published by the Dutch Centraal Bureau voor de Statistiek concerning savings and loans banks in the Netherlands to consider the distinctions

between the various bank types in 1909 using a "performance" framework, and in doing so we provide a quantitative outline of the financial landscape. Furthermore, in section 4.9 (which follows the conclusion), we also provide a comparison of the attributes of the various bank types. For now, we use indicators based on those set out in the United Nation's 'Core Performance Indicators for Microfinance'[41] and in the World Bank's microfinance handbook.[42] To be clear, we are not making any claims about similarity between the Dutch institutions in our study and modern microfinance institutions, but instead we recognise the possible value of microfinance indicators in providing a quantitative reflection of institutional operation and function. The measures used are summarised in table 4.1.

Table 4.1. *Measuring performance*

Indicator	*Measured by*
Social performance	
Outreach	Number of accounts / (population / 1,000) Number of loans / (population / 1,000)
Client poverty	Average account size Average loan size
Financial performance	
Profitability (ROA)	(Profit*100) / total assets
Efficiency	(Administration costs*100) / revenue
Sustainability	(Reserves*100) / total assets
Liquidity	(Cash*100) / total assets

Sources: Based on http://www.uncdf.org/sites/default/files/Documents/indicators.pdf (Core Performance Indicators for Microfinance) and Ledgerwood, ed. (2013).

Table 4.2 displays the summary statistics for the main bank types. These are computed using bank-level observations, except for the Post Office Savings Bank where the aggregate-institution statistics are used. The first two indicators, account size and the number of accounts, concern only savings institutions, and reveal obvious

[41] http://www.uncdf.org/sites/default/files/Documents/indicators.pdf.
[42] The New Microfinance Handbook (Joanna Ledgerwood ed., 2013).

differences between such banks. Raiffeisen banks on average have relatively large accounts (*f*426), but reach fewer persons (41 accounts per 1,000 persons) than either of the other institution types. By contrast, the Post Office Savings Bank has substantially smaller accounts (*f*110), but reaches a much larger clientele (250 accounts per 1,000 persons). Somewhere between these two, savings banks hold a more intermediate position both in terms of account size (*f*281) and outreach (128 accounts per 1,000 persons).

The next two indicators reveal further differences in the market for loans. Help banks in 1909 have an average loan size of *f*265, compared to *f*677 for Raiffeisen banks. Furthermore, while we do not know the value of individual pawns, it is likely they are mostly of very small value, with reports of individuals even pawning their winter clothes during the summer months and bicycles during the winter. For outreach, there is less difference between help banks and Raiffeisen banks, although pawn banks are making a large number of pawns. The latter is consistent with historical evidence which points to a huge amount of pawning—for example, in 1909 seventeen pawn banks made 2.1 million pawns.[43]

Differences are also obvious across the remaining indicators, which relate to "financial performance". First, in terms of profitability, as measured by ROA, Raiffeisen banks have noticeably lower returns (0.25 per cent) than either of the other savings institutions (1.18 and 0.78 per cent). In ways this is unsurprising, given that many Raiffeisen banks are relatively new institutions, focus on reinvesting profits within a simple savings-and-loans model, and enjoy an ownership structure whereby profits are essentially internalised in the advantageous rate of interest versus

[43] Information from the report concerning savings and loans banks published by the Centraal Bureau voor de Statistiek.

competitors. By contrast, savings banks, where ROA is highest, are more established, and have a more complex asset mix in which profitability likely forms a more important function in their sustainability. On the loan side, further differences are obvious, with help banks having a comparatively high ROA (2.47 per cent) relative to Raiffeisen banks, while for pawn banks ROA is negative.

Turning to efficiency as measured by the extent of administration costs, we see that savings banks having an obvious efficiency advantage. Specifically, savings bank administration to revenue is around 6.5 per cent, while for the other institution types it is over 10 per cent. On the savings side, this differential may reflect the relative size-advantage of savings banks and their related economies of scale, in contrast to the Post Office Savings Bank, which deals with many more small-value transactions, and the Raiffeisen banks, which are relatively smaller institutions. On the loan side, the administrative burden is particularly high for the help banks (29 per cent) and especially for pawn banks (66 per cent). This differential likely reflects transaction size as help banks, and to a much greater extent pawn banks, are dealing with smaller loan transactions than Raiffeisen banks.

For the final two indicators, further differentiation is shown among the bank types. For liquidity, as measured by cash to assets, Raiffeisen banks hold on average more cash (5.1 per cent) than the other savings institutions, and the Post Office Savings Bank relatively least (1.3 per cent). The higher cash holdings of Raiffeisen banks may reflect their simple model, which emphasises deposits and loans, and thus creates a time imbalance issue in liquidity terms. For the Post Office Savings Bank their lack of cash may reflect their savings specialism, and to some extent their state guarantee. Similar to the Raiffeisen banks, the other loan institutions —help banks (6.2 per cent)

and pawn banks (7.2 per cent)—hold more cash per assets than savings banks or the Post Office Savings Bank. Among the savings institutions, savings banks have a larger buffer of reserves compared to the other bank types—consistent with their established status and more complex investment strategy. While on the loan side both help banks and pawn banks have high holdings of reserves.

Table 4.3 extends the analysis to distinguish between the different network affiliations of the Raiffeisen banks, and their associated religious identity. The networks linked to central banks in Eindhoven and Alkmaar were Catholic, while the network linked to the central bank in Utrecht was *de facto* Protestant. While limited by the small number of observations for Alkmaar, there is some evidence that this network has smaller, but more, accounts than either Utrecht or Eindhoven, where there is less obvious difference. For loans, Utrecht makes noticeably larger loans than either of the Catholic networks, while Alkmaar makes relatively more loans than either Eindhoven or Utrecht. Among the "financial performance" indicators, we see first that there is limited difference in return on assets across the bank types. For the remaining indicators, Alkmaar has the highest percentages of administration, reserves, and cash, however overall these remaining indicators do not seem to considerably differ by Catholic or Protestant network affiliation.

Table 4.4 provides further perspective on potential competition between some of the main bank types. We exploit the co-location of various institutions in our sample to consider whether this creates a performance differential, focusing in particular on the performance indicators for savings banks and help banks disaggregated by whether they have a Raiffeisen bank in their municipality in 1909. This reveals that for savings banks in a municipality with a Raiffeisen bank both account size and the number of

accounts is reduced, suggesting at least some overlap in savings clientele. For help banks, there is some evidence of a similar competition effect for loan size, although the results for the number of loans is more difficult to interpret, perhaps due to the small number of observations. Among the remaining "financial performance" indicators, the effect of a Raiffeisen bank appears generally less significant, at least for savings banks where the results are easier to compare (given the larger number of observations).

Table 4.2. *Performance statistics by bank type (1909)*

Indicator		*Raiffeisen*	*Savings*	*PO Savings*	*Help*	*Pawn*
	Mean	425.66	280.72	109.68	–	–
Account size	Median	394.21	254.79	–	–	–
	Std. dev.	213.92	148.05	–	–	–
	Mean	41.33	128.36	249.67	–	–
Number of accounts	Median	28.61	88.89	–	–	–
	Std. dev.	43.48	152.13	–	–	–
	Mean	677.10	–	–	265.33	–
Loan size	Median	517.83	–	–	131.63	–
	Std. dev.	1015.15	–	–	430.12	–
	Mean	7.13	–	–	6.90	1040.56
Number of loans/pawns	Median	4.23	–	–	3.99	982.69
	Std. dev.	8.02	–	–	13.21	517.26
	Mean	0.25	1.18	0.78	2.47	-0.81
ROA	Median	0.36	1.04	–	1.88	-0.11
	Std. dev.	0.77	0.87	–	3.63	3.13
	Mean	11.13	6.48	10.83	29.23	65.78
Admin. to revenue	Median	7.77	5.04	–	24.31	68.64
	Std. dev.	18.65	4.98	–	23.04	26.57
	Mean	1.30	13.36	1.06	17.97	9.92
Reserves to assets	Median	0.91	13.02	–	8.61	7.40
	Std. dev.	1.80	7.07	–	19.89	12.69
	Mean	5.11	1.99	1.27	6.24	7.21
Cash to assets	Median	3.91	1.25	–	2.12	5.15
	Std. dev.	4.96	2.31	–	11.59	4.97
	Min. obs.*	481	213	1	51	17

Notes: Min. obs. is the minimum number of observations used to compute the statistics. The number of observations differs by statistic because not all information is available for every bank.

Source: Bijdragen tot de Statistiek van Nederland. Nieuwe Volgreeks. Uitgegeven door het Centraal Bureau voor de Statistiek. Statistiek der Spaar- en Leenbanken in Nederland (CLXVI, 1909/10). Volkstelling van het Jaar 1909 (available at: http://www.volkstellingen.nl).

Table 4.3. *Performance statistics for Raiffeisen banks by network (1909)*

Indicator		*Alkmaar*	*Eindhoven*	*Utrecht*
	Mean	335.05	414.15	445.10
Account size	Median	281.69	398.83	399.16
	Std. dev.	288.85	183.61	229.68
	Mean	66.42	40.52	38.61
Number of accounts	Median	55.15	29.27	25.17
	Std. dev.	56.29	37.45	42.54
	Mean	599.27	661.06	707.20
Loan size	Median	467.28	477.14	545.00
	Std. dev.	321.70	1313.21	517.29
	Mean	15.31	6.04	7.58
Number of loans	Median	10.14	3.76	4.41
	Std. dev.	15.27	6.03	8.24
	Mean	0.46	0.21	0.27
ROA	Median	0.30	0.37	0.35
	Std. dev.	0.58	0.64	0.88
	Mean	10.80	12.44	10.06
Admin. to revenue	Median	10.15	6.91	8.62
	Std. dev.	5.05	26.43	7.42
	Mean	1.53	1.52	1.08
Reserves to assets	Median	1.11	0.97	0.79
	Std. dev.	1.11	1.74	1.89
	Mean	8.01	4.55	5.42
Cash to assets	Median	4.85	3.90	3.96
	Std. dev.	8.21	3.42	5.75
	Min. obs.*	18	255	203

Notes: Min. obs. is the minimum number of observations used to compute the statistics. The number of observations differs by statistic because not all information is available for every bank.

Source: Bijdragen tot de Statistiek van Nederland. Nieuwe Volgreeks. Uitgegeven door het Centraal Bureau voor de Statistiek. Statistiek der Spaar- en Leenbanken in Nederland (CLXVI, 1909/10). Volkstelling van het Jaar 1909 (available at: http://www.volkstellingen.nl).

Table 4.4. *Performance statistics for savings and help banks with and without Raiffeisen bank presence (1909)*

Indicators		*Savings banks*		*Help banks*	
		Raiff.	*No Raiff.*	*Raiff.*	*No Raiff.*
Account size	Mean	255.43	296.00	–	–
	Median	227.56	265.21	–	–
	Std. dev.	151.96	144.01	–	–
Number of accounts	Mean	100.66	145.09	–	–
	Median	84.34	94.45	–	–
	Std. dev.	72.41	182.53	–	–
Loan size	Mean	–	–	248.27	272.30
	Median	–	–	120.71	136.00
	Std. dev.	–	–	401.00	445.28
Number of loans	Mean	–	–	7.63	6.60
	Median	–	–	5.13	2.25
	Std. dev.	–	–	9.74	14.46
ROA	Mean	1.16	1.19	1.71	2.82
	Median	0.99	1.07	1.58	2.02
	Std. dev.	1.05	0.75	1.59	4.23
Admin. to revenue	Mean	6.85	6.25	27.85	29.86
	Median	5.25	4.85	26.76	22.05
	Std. dev.	5.74	4.46	18.68	25.01
Reserves to assets	Mean	13.49	13.29	14.59	19.38
	Median	12.42	13.30	1.80	17.84
	Std. dev.	7.76	6.65	24.42	17.84
Cash to assets	Mean	2.34	1.78	5.30	6.63
	Median	1.35	1.11	2.60	1.94
	Std. dev.	2.49	2.18	7.55	12.97
	Min. obs.*	81	132	16	35

Notes: Min. obs. is the minimum number of observations used to compute the statistics. The number of observations differs by statistic because not all information is available for every bank.

Source: Bijdragen tot de Statistiek van Nederland. Nieuwe Volgreeks. Uitgegeven door het Centraal Bureau voor de Statistiek. Statistiek der Spaar- en Leenbanken in Nederland (CLXVI, 1909/10). Volkstelling van het Jaar 1909 (available at: http://www.volkstellingen.nl).

4.4. Organisational Architecture

The cooperative organisational form was one of the unique attributes which distinguished the entrant Raiffeisen banks from incumbents. In 1899, the year following the market entry of the first Dutch Raiffeisen bank, there were already 924 cooperative organisations across the agricultural sector, 416 of them in dairying (Wintle, 2000). Raiffeisen banks were just the latest organisation to adopt this new organisational form. But what is a cooperative exactly; what made them different from other business organisations? Put simply, a cooperative organisation is an association of economic actors that unite voluntarily to meet their common goals—economic, social, or cultural—through a jointly-owned and controlled business venture. Not all cooperatives have the same ownership structure; some are owned collectively by producers, while others are owned by consumers of the business. Raiffeisen banks differed from other early mutual banks, such as building societies, in that they were owned by debtors (i.e. borrowers) rather than creditors (i.e. savers). All such banks confined their market to a single locality, or even a single religious denomination within that locality. These credit cooperatives belonged to one of three networks, the central banks of which acted as clearinghouses, auditing authorities, and lenders-of-last resort for their network (Colvin, 2017).

While the welfare gains from specialisation and trade are shared between buyers and sellers, at cooperatives the buyers and sellers are often the same economic actors, and so welfare gains remain with the cooperators themselves. As a result of this alternative organisational architecture, cooperatives have very different business objectives; cooperatives are not profit-maximising firms in the traditional sense. Indeed, they are arguably not even independent business ventures, but instead simply

extensions of each individual cooperator's private interests. Where a conventional company seeks to maximise returns for its owners and managers, a cooperative's owners and managers may instead maximise their own returns by minimising those of the cooperative organisation that they co-use, co-own, and co-manage.[44]

Dutch Raiffeisen banks, which were unlimited liability organisations, possessed no share capital and, aside from their own resources, had access only to the excess savings which they could borrow from other Raiffeisen banks, arranged exclusively through their central-bank apex institution. They relied on deposits as their principal source of leverage. Indeed, in practice the managers of these banks aimed to attract and retain savings deposits wherever they could and borrowed externally only when necessary (Colvin, 2017). The core business objective of these banks, then, was to finance the expansion of their loans portfolio to liable members, and the cheapest possible way to do this was to attract new savings deposits from existing and new customers, members and non-members alike.

The principal organisational innovation that the literature on cooperative credit organisations argues is necessary to render them going concerns is joint liability or group lending (Banerjee et al., 1994; Guinnane, 2001). This lending model enables small-scale business to borrow with little or no collateral by making cooperators liable for one another's financial losses. Adverse selection is reduced as group members are screened; they must fulfil certain requirements before they can join, such as a minimum deposit or membership of an allied social or cultural organisation. Providing the group is small and geographically concentrated, members are more able to monitor

[44] This is in line with the model of cooperative behaviour proposed for the Italian case in Galassi (2001). More generally it falls in the "cooperatives as an extension of the farm" approach to cooperative theory discussed in Cook et al. (2004).

one another's effort and punish bad behaviour through social ostracism, and can therefore reduce free riding and moral hazard. As cooperators are all in similar lines of business, they can more easily verify one another's business performance. As members engage in long-term repeated interaction and as it is difficult and costly to renounce membership, a cooperative outcome which benefits all members at least a little, and from which it is not in the interest of any one member to deviate, is therefore sustainable.

4.5. Hypothesis Development

This section considers three potential hypotheses which may explain the general conditions that influenced the entry propensity and subsequent performance of Raiffeisen banks, and which can be tested statistically. These explanations should not be considered as mutually exclusive.

4.5.1. Market Demand

The traditional argument put forward in the agricultural, business, and economic history literatures is that Raiffeisen banks were created in response to an unfulfilled demand for credit from the unbanked and underbanked (Sluyterman et al., 1998; Van Zanden and Van Riel, 2004; Bieleman, 2008). The roots of this view lie principally with the government agricultural inquiries conducted in the late-nineteenth century (Landbouwcommissie, 1890), but perhaps more importantly with the propaganda emanating from the cooperative banks themselves. Van der Marck's (1924) pamphlet is a typical example of the latter. This pamphlet was written by the spiritual advisor (*geestelijke adviseur*) to CCB-Eindhoven, the main Catholic Raiffeisen bank network, and appears to form part of a "media strategy" for the external justification of this

network's existence. It attributes any growth in the rural economy to the cooperative movement itself and states that Raiffeisen banks 'have set farmers free' from their previous financiers, thus permitting farmers to 'help themselves by helping each other'.

The pamphlet's main argument is that the market entry of cooperative banks meant that farmers no longer had problems finding external financing. If true, this means that incumbent financial intermediaries must have been engaging in either "credit rationing" or "red-lining" behaviour (Freixas and Rochet, 2008). Credit rationing occurs when borrowers' demands for credit are turned down, even if these borrowers are willing and able to pay both the interest rate and meet the collateral requirements of prevailing loan contracts. By contrast, red-lining occurs when complete categories of borrowers are totally excluded from the credit market because they are unwilling and/or unable to pay the interest rate and/or meet the collateral requirement of prevailing loan contracts.

While both phenomena force farmers to self-finance or abandon their projects, they imply very different conduct by the incumbent suppliers of financial services. Credit rationing implies that incumbents could have increased their market share still further and attract additional creditors by increasing the price of their loan contracts, but that they were unwilling to do so due to the potential high risk of such borrowers' projects, or due to the presence of some hidden information about the project which could make verification of its financial outcomes too costly. Red-lining, by contrast, implies that incumbents could have increased their market share only by *reducing* the price of their loan contracts, but were unwilling to do so because the expected returns on the projects which such loan contracts would attract were insufficient.

Micro-business histories of Raiffeisen banks in the south of the Netherlands by Jonker (1988) and Brusse (2009) provide evidence that the market for agricultural credit was already satiated by the time the cooperatives entered it. This argument implies that the sector's origins were not demand-led. Additionally, Jonker (1988) shows that the new Raiffeisen banks were largely used as savings institutions, a type of service already provided by incumbents, especially the Post Office Savings Bank. Essentially, the argument is that no new market for banking services—either for borrowing or saving—was created with the arrival of cooperatives, only additional competitors added to an already crowded scene. These studies imply that incumbents were engaging in credit rationing; credit was already available, and incumbents could have attracted more custom by offering services to more risk-loving individuals willing to take on higher interest rates. However, the fact that Raiffeisen banks offered *lower* interest rates than incumbents meant that they were targeting less profitable opportunities; incumbents were likely red-lining. The idea here is that a new organisational technology protected Raiffeisen banks from the associated risk of attracting undesirable, riskier, customers, thus making them going concerns.

The hypothesis is therefore that these business organisations chose a unique organisational form that permitted farmers to compete away a share of the existing financial market from incumbents, and/or deepen the market to capture customers previously excluded from it. Raiffeisen banks may have been able to attract savers in rural parts of the Netherlands and displace incumbents exactly because of their cooperative ownership; capturing producer and consumer surplus meant that the interest rates offered on savings could be consistently above those offered by the Post Office Savings Bank, an organisation which, unlike the Raiffeisen cooperatives, enjoyed a full state guarantee. Cooperators—who were both owners and customers—

were able to internalise any profit before it reached the cooperative business organisation itself, by setting below-market interest rates on loans.

4.5.2. Agricultural Change

Despite the Netherlands' small size, Dutch agriculture was region-specialised and clustered, with areas focusing on types of agriculture that best suited their soil type and labour costs. Knibbe (1993) shows significant regional variation in agriculture: coastal provinces were predominantly horticultural, eastern provinces on the German border specialised in growing grains and crops, and northern provinces saw intensive cattle farming. Until the advent of costly artificial fertiliser at the end of the nineteenth century, yields in eastern provinces were far lower than western areas (Wintle, 2000). The timing of the proliferation of Raiffeisen banks across the Netherlands could have been a response to the Long Depression of the late-nineteenth century (Van Zanden and Van Riel, 2004). This crisis, which lasted from the early-1870s to the mid-1890s, saw sustained falls in agricultural prices. Grain prices were especially affected, and so arable farmers suffered more than those in livestock and horticulture (Wintle, 2000, p. 175; Bieleman, 2010, p. 155). The hypothesis here, then, is that the demand for Raiffeisen banks arose earlier in land-types affected most severely by the crisis, especially in arable and to a lesser extent pasture.

However, the course of Raiffeisen banks from the late-nineteenth century may also reflect ongoing changes in agriculture, which were linked, at least to some extent, to the crisis period. Small, family farms flourished (Bieleman, 2010, p. 158), as large farms became less important (Van Zanden and Van Riel, 2004, p. 290); arable farming declined as livestock farming became more prevalent; and the use of inputs such as fertilizers soared (Van Zanden and Van Riel, 2004, p. 284). In addition, the financial

position of farmers improved as time passed, with surplus funds for saving rising as the rural economy recovered from the crisis (Van Zanden and Van Riel, 2004, p. 294). As a result, while different land uses during the crisis may have generated variation in the demand for banks, the aforementioned factors may also have been functionally important in the post-crisis trajectory of the new Raiffeisen institutions.

Cooperation in Dutch rural finance occurred simultaneously with cooperation in other types of rural business: cooperative organisations were emerging across rural areas, changing the ownership and incentive structure throughout agriculture. The returns to the cooperative organisational form adopted by Raiffeisen banks were partly captured by the various other agricultural cooperatives that were instrumental in founding and subsequently using these banks. Indeed, cooperative banks could be viewed as an extension of these other cooperatives, an attempt to further internalise any gains from trade.[45] By self-financing agricultural improvement, farmers were creating vertically integrated business organisations. Not only does this result in the elimination of margins through the supply chain and costs associated with information asymmetries, but it also reduced incentive problems as the owners and users of capital were now the same economic actors. But self-financing, or "disintermediation", was only possible once the rural economy had fully recovered from the Great Agricultural Crisis, when there was sufficient savings surplus to reinvest in agricultural improvement (Van Zanden and Van Riel, 2004).

Douma (2001) uses transaction cost economics to explain why cooperative businesses have proved more successful in some markets than others. Illustrating his theory with the case of Dutch agricultural cooperatives in the late-nineteenth century,

[45] Rommes (2014) documents many cases of overlapping membership and management of different types of rural cooperatives, further evidence of this integration.

he argues that different organisational forms compete with one another. He argues that the cooperative form was only successful where the type of agriculture was most suited to this ownership structure. He also highlights differences within the same agricultural sector: dairying business that required a rapid distribution network, for fresh milk production in urban areas, proved less successful under cooperative ownership than where distribution was unimportant, for cheese production in rural areas. In the context of the present study, then, the hypothesis is that Raiffeisen banks were most successful where the type of agriculture conducted there was most in need, and could afford, this new organisational form, but also where the nature and concentration of their target market, or indeed their customers' target market, was the most cost effective for their peculiar organisational architecture.

4.5.3. Economic Confessionalism

The third argument for the origins of Raiffeisen banks concerns the growing role of confessionalism around the time of the cooperative movement's inception. By the late-nineteenth century, most Dutch citizens identified themselves strongly with one religious denomination: Roman Catholicism or one of the various Calvinist denominations. Dutch enterprise and society became highly segregated along religious lines, with the different Christian denominations developing sophisticated parallel social, economic, and political institutions and organisations. This phenomenon, known as pillarisation (*verzuiling*), reached its zenith in the interwar period. Its origins have been analysed, among others, by Kruijt (1974), Lijphart (1979), Stuurman (1983), De Rooy (1995), and Luykx (1996), and, in the context of bank risk-taking in the cooperative sector, by Colvin (2017).

The argument put forward or implied in the work of Jonker (1988), Van Zanden

and Van Riel (2004), and Rommes (2014) is that sociopolitical interest groups—the Roman Catholic clergy above all—were crucial in the creation of the first cooperative banks and that these groups viewed cooperatives as a way of consolidating or extending their political influence.[46] Pillarisation affected Raiffeisen banks through institutionalised confessional politics, described most completely in this context in Smits (1996), and summarised as follows. Provincial agricultural companies (*landbouwmaatschappijen*), established in the first half of the nineteenth century, aimed to stimulate the improvement of agricultural technology by organising trade fairs, subsidising agricultural consultants, and dealing with pests and diseases. These institutions were not universally loved, however. Devastating criticism came from the Catholic press, which argued that efforts by the agricultural companies were not easing the plight of Catholic farmers. Against this backdrop, there were calls for the creation of business cooperatives from the Catholic priesthood in response to *Rerum Novarum*, a Papal Encyclical (open letter to the clergy) in support of anti-socialist confessional trade unionism (Pecci, 1891).

And so, a new organisation for Dutch agriculturalists was established in 1895: the Dutch Farmers' Union (Nederlandsche Boerenbond, NBB) (Smits, 1996; Van Zanden and Van Riel, 2004). The founding of new regional unions soon followed and most, in turn, joined the NBB on a federal basis. The Noord-Brabant Christian Farmers' Union (Noordbrabantse Christelijke Boerenbond, NCB) was the largest and most influential such union. It was instigated and led by a Catholic priest. In theory, the difference between the farmers' unions and the agricultural companies was that the

[46] This is much in line with the ideas of Stuurman (1983) and Luykx (1996) in their wider analysis of pillarisation, both of whom argue that the phenomenon was Catholic-led. But while the former sees it as part of a wider political struggle for minority rights, the latter argues that pillarisation was a form of social control by Catholic elites over the working classes rather than a reaction to discrimination.

first were created from the ground up by farmers while the second were centrally imposed on farmers by an elite. However, the actual difference appears to have been that, unlike the agricultural companies, the unions' aims were religiously motivated, such as the NCB's aim of 'furthering the interests of God, the family and property' (Smits, 1996). These unions were predominantly Catholic affairs; farmers from the two majority-Catholic provinces made up 73 percent of the NBB's membership in 1904. The agricultural companies became *de facto* Protestant when Catholic farmers left them to join their new unions.

Jonker (1988) argues that it was the regional farmers' unions that were the primary instigators of Raiffeisen banks in majority-Catholic Noord-Brabant. Catholic priests and others working on behalf of the unions would visit villages to spread the idea of cooperation. These propagandists would help villagers write their new organisations' statutes and provide them with a small amount of initial financing. Local priests would be recruited to provide these cooperatives with day-to-day "spiritual guidance". In Protestant parts of the country, it was the agricultural companies and other local elites that performed this same function, but only in response to nearby "Catholic-only" cooperative efforts. The hypothesis, then, is that Catholic-majority areas of the country were the first to enjoy Raiffeisen banks, but that religious affiliation became less important over time, as Protestant elites caught up and replicated the work of Catholic elites.

An allied hypothesis regarding religion concerns banks' local socioreligious status. Following Colvin (2017), the idea here is that Raiffeisen banks functioned as "club goods" for a locality's farmers. Raiffeisen banks functioned as close-knit "credit clubs" which benefitted from improved screening and monitoring, and were

strengthened by common social norms, the consequences of which increased the cost of group entry and exit. Banks serving a locality's religious minority group, either Catholic or Protestant, are hypothesised to have been particularly successful at avoiding free riding behaviour, and so could likely organise and enter earlier, and then perform better.

4.6. Data and Empirical Strategy

We construct a dataset which pools information from a variety of sources in order to investigate our three hypotheses for the market entry and subsequent performance of the Raiffeisen banks, namely: (1) to meet untapped market demand for financial services; (2) as an organisational response to agricultural and technical change; and (3) as a means of extending and consolidating the influence of confessional, pillarised, sociopolitical organisations. First, we obtain bank-level information for various savings and loans institutions from annual reports published by the Netherlands' Centraal Bureau voor de Statistiek. The reports collate accounting information for the various banking organisations, and although they are voluntarily reported, there is good coverage and detailed information provided.[47] Bank-level data are available for savings banks and offices, help banks, pawn banks, and Raiffeisen banks, while aggregated data are provided for the Post Office Savings Bank. The information available covers deposit accounts, loans, the balance sheet, the profit and loss account, the investment account, and, although aggregated somewhat, the occupational background of new savers.[48] We direct our attention to the years 1898, 1904, and 1909,

[47] In 1909 the number of institutions in the register and the percentage of those reporting statistics is as follows: savings banks – number: 346, reporting: 62 to 71 per cent; Raiffeisen banks – number: 603, reporting: 95 to 97 per cent; help banks – number: 112, reporting: 46 to 62 per cent; pawn banks – number: 17, reporting: 100 per cent.

[48] Unfortunately, this information is not available for all bank types.

to focus on the early years of Raiffeisen bank entry. To these data, we also add information about the location of the Post Office Savings Bank branches using its annual reports, because this information is unavailable in the previously mentioned publications.

We further supplement the bank-level observations with municipality-level information. Land-use information at the municipality-level is available from a tax survey conducted in the late 1880s. For each municipality (*gemeente*), we are able to ascertain land area by specific use, including arable, pasture, and horticulture, as well as the tax value.[49] Socioeconomic information is available from the census reports. We use the 1909 census as it provides occupational information for all the municipalities, as well as population density and religious affiliation data.

From the collated data, we construct variables, defined in table 4.5, to test the three hypotheses for Raiffeisen bank entry outlined previously. Summary statistics are shown in table 4.6. First, we include the presence of incumbents to better understand the effect of pre-existing supply of banking services on entry propensity. We use dummy variables to account for the co-location of savings institutions, help banks, pawn banks, and Post Office Savings Bank branches in the municipality, taking an earlier observation point to capture the pre-existence of these institutions.

Our second set of hypothesis variables relate to the agricultural environment in which the banks existed. First, we include the relative combination of arable, pasture, and horticultural land. Given that the agricultural crisis may have affected these land types unequally, perhaps the demand for banks arose earlier in land types affected most by the crisis. Alternatively, banks may also have been a source of credit for more

[49] In 1909 there were 1,121 municipalities nationwide.

capital intensive farming. We also account for the extent of farming and urbanisation in each municipality as measured by farmer representation in the population and population density. In addition, we include land per farmer and tax value because we expect that these may have affected financial-service demand given their association with capital needs and wealth.

Finally, we test our third hypothesis using the percentage of Catholics in a municipality given suggestions that the Catholic Church and its clergy may have provided an impetus for cooperation. Where the unit of analysis is the bank, as opposed to the municipality, we are also able to account for the minority status of a bank. A minority bank is one where its religious association, as indicated by the network to which it is attached, matches the religious affiliation of the religious minority population in that particular municipality.

Our empirical approach takes two stages. First, as related to our three hypotheses, we address the factors which precipitated the entry of Raiffeisen banks. We begin by using bank age as a dependent variable to ascertain the conditions most critical to the entry of the first Raiffeisen banks. Given that the specification is from the perspective of existing banks, we anticipate that the results will reflect most acutely the initial catalyst for their entry. We utilise an OLS model with robust standard errors.

Following this, we employ the presence in an area, in 1904, of a Raiffeisen bank, and then the presence of a Raiffeisen bank which entered between 1905 and 1909, as dependent variables. This differs from the first set of regressions as we now adopt a municipality viewpoint as opposed to a bank-level perspective. We expect that these specifications likely reflect the initial catalyst(s) less acutely, but instead help to reveal whether the early drivers of entry remained important with the advancement of time.

Given that the dependent variable is now a binary variable (0 or 1), we utilise a probit model.

The second stage of our empirical approach addresses the factors which contributed to the post-entry "success" of Raiffeisen banks, focusing on the 1909 statistics. Here we are interested in whether the factors that induced entry are similar to those which drive post-entry performance. We expect, given the cooperative nature of Raiffeisen banks, that they are not necessarily concerned with profit maximisation, and so utilise a variety of alternative dependent variables to address possible performance nuances. Nevertheless, we begin with return on assets, not to measure profit in a strict sense, but rather to provide an indication of financial sustainability. After all, profits were retained by Raiffeisen banks and paid into a reserve account at the end of each financial year. Secondly, we use deposit growth, which is arguably imperfect as it only considers growth from the previous financial year. However, *new* savings deposits were the principal source of funds for *new* loans to members, and so we expect that this year-on-year growth reveals banks' ability to take on *new* business. The final two dependent variables are account size and outreach, which provide an indication of the amount of funds being saved and the number of persons that were being served. As well as using similar hypothesis variables to those used for considering entry, we also control for bank-specific characteristics, and adopt an OLS model for the regression analysis.

Table 4.5. *Description of variables*

Variable	*Description*	*Source*
Bank age	Bank age in years (1910 minus year of entry)	A
Early entry	Dummy variable = 1 if Raiffeisen bank entered by 1904, = 0 otherwise	A
Late entry	Dummy variable = 1 if Raiffeisen bank entered between 1905 and 1909, = 0 otherwise	A
ROA	Profit as a percentage of assets	A
Deposit growth	Percentage change in deposits between 1908 and 1909	A
Account size	Total value of deposits in guilders divided by the total number of accounts	A
Outreach	Number of deposit accounts per 1,000 persons in the municipality	A & D
Savings bank	Dummy variable = 1 if savings bank present, = 0 otherwise	A
Help bank	Dummy variable = 1 if help bank present, = 0 otherwise	A
Pawn bank	Dummy variable = 1 if pawn bank present, = 0 otherwise	A
PO bank	Dummy variable = 1 if Post Office Savings Bank branch present, =0 otherwise	B
Raiffeisen bank	Dummy variable = 1 if Raiffeisen bank present, = 0 otherwise	A
Arable	Percentage of arable land (of arable, pasture, and horticultural)	C
Horticulture	Percentage of horticultural land (of arable, pasture, and horticultural)	C
Farmers	Percentage of farmers in the population	D
Land per farmer	Total land area in hectares / number of farmers	C & D
Tax value	(Tax value in guilders / 1,000) / total taxable land area in hectares	C
Population density	Population density per km^2 / 1,000	D
Roman Catholic	Percentage of Roman Catholics in the population	D
Minority	Dummy variable = 1 if bank attached to network whose religion matches the minority population, = 0 otherwise	A & D
Bank size	Value of deposits in guilders /10,000	A
Securities	Percentage of assets held in securities	A
Property	Percentage of assets held in property	A
Mortgages	Percentage of assets held in mortgages	A
Loans	Percentage of assets held in loans	A
Cash	Percentage of assets held in cash	A
Administration	Administration costs as a percentage of revenue	A
Reserves	Reserves as a percentage of assets	A

Sources:

A. Bijdragen tot de Statistiek van Nederland. Nieuwe Volgreeks. Uitgegeven door het Centraal Bureau voor de Statistiek. Statistiek der Spaar- en Leenbanken in Nederland (V, 1898; LXXIII, 1904; CLXVI, 1909/10).

B. Verslag aan de Koningin betrekkelijk den dienst der Rijkspostspaarbank in Nederland (1898; 1904).

C. Verslagen van de Hoofdcommissie voor de herziening der belastbare opbrengst van de ongebouwde eigendommen (1890).

D. Volkstelling van het Jaar 1909 (available at: http://www.volkstellingen.nl).

Table 4.6. *Summary statistics*

Variable	*Mean*	*Std. dev.*	*Obs.*
Bank age regressions (table 4.7)			
Bank age	5.70	3.10	579
Savings bank (98)	0.20	0.40	579
Help bank (98)	0.05	0.22	579
Pawn bank (98)	0.03	0.16	579
PO bank (98)	0.90	0.30	579
Arable	42.82	27.56	579
Horticulture	4.10	6.58	579
Farmers	9.36	5.99	579
Land per farmer	13.96	9.36	579
Tax value	0.04	0.03	579
Population density	0.24	0.82	579
Roman Catholic	58.00	38.49	579
Minority bank	0.22	0.41	579
Bank presence regressions (table 4.8)			
Early entry / Raiffeisen bank (04)	0.23	0.42	1,121
Late entry	0.25	0.43	1,121
Savings bank (98)	0.21	0.41	1,121
Savings bank (04)	0.24	0.43	1,121
Help bank (98)	0.05	0.22	1,121
Help bank (04)	0.06	0.25	1,121
Pawn bank (98)	0.02	0.14	1,121
Pawn bank (04)	0.02	0.14	1,121
PO bank (98)	0.85	0.36	1,121
PO bank (04)	0.87	0.34	1,121
Arable	41.16	28.66	1,121
Horticulture	4.66	7.98	1,121
Farmers	8.08	6.13	1,121
Land per farmer	17.42	20.64	1,121
Tax value	0.05	0.03	1,121
Population density	0.34	1.08	1,121
Roman Catholic	41.77	40.39	1,121

Variable	*Mean*	*Std. dev.*	*Obs.*
Bank performance regressions (tables 4.9–4.13)			
ROA	0.26	0.77	560
Deposit growth	45.12	111.17	516
Account size	427.92	207.87	560
Outreach	41.07	43.56	560
Savings bank (09)	0.24	0.42	560
Help bank (09)	0.06	0.23	560
Pawn bank (09)	0.02	0.15	560
PO bank (04)	0.92	0.27	560
Other Raiffeisen bank (09)	0.33	0.47	560
Arable	42.86	27.35	560
Horticulture	4.08	6.58	560
Farmers	9.42	6.04	560
Land per farmer	14.05	9.44	560
Tax value	0.04	0.03	560
Population density	0.25	0.83	560
Roman Catholic	57.83	38.66	560
Minority bank	0.22	0.41	560
Bank age	5.72	3.08	560
Bank size	4.75	4.05	560
Securities	3.31	9.18	560
Property	0.91	3.72	560
Mortgages	0.48	3.38	560
Loans	48.95	26.51	560
Cash	5.13	4.99	560
Administration	11.17	18.82	560
Reserves	1.31	1.81	560

Sources: See table 4.5.

4.7. Regression Analysis

4.7.1. Market Entry

Table 4.7 reports the results of an OLS model regressing bank age on a selection of potential explanatory factors. Each of the columns represent alternative specifications, with columns 1 to 4 displaying the regression outputs for each of the hypotheses, and column 5 including the full set of hypothesis variables. For hypothesis 2, we split the regressions into two parts to separate out specific categories of variables.

The first set of hypothesis variables relate to market demand and interbank competition, proxied by the presence of incumbents. The results reveal that the presence of another institution in 1898 is generally not significantly associated with Raiffeisen bank age. As such, the presence, or lack thereof, of other banks in an area does not appear to have driven demand for the emergent banks.

The second set of explanatory variables relates to banks' agricultural environment. Perhaps unsurprisingly, given the banks' agricultural emphasis, there is some evidence that the percentage of farmers is positively associated with Raiffeisen bank age. By contrast, land per farmer (in column 3) has a significant negative association with the dependent variable, suggesting that demand for credit among small farmers may have been a driver of earlier bank entry. In addition, horticulture shows a significant negative association with bank age relative to arable and pasture farming. Given that this sector was less affected by the Long Depression, it may have been that there was less demand for credit among farmers in this sector. The magnitude of the horticulture coefficient in column 5 suggests that a bank located in an area that is one standard deviation "to the left" of the mean in terms of horticultural land use is

associated with a bank age of 6.6 additional months.

With respect to the final hypothesis, which relates to religion, the results highlight a consistent positive and statistically significant association between bank age and Roman Catholicism. This suggests that a higher Catholic concentration was conducive to the earlier entry of Raiffeisen banks, fitting well with existing evidence on the role of Catholic clergy in catalysing their initial emergence. Furthermore, the second religious explanatory factor, minority status, also shows a significant positive association with bank age. This suggests that banks also tended to enter earlier into areas where they served the religious minority population, although in statistical significance terms this association is less pronounced. The magnitude of the Roman Catholic and minority bank coefficients in the final specification suggest that a bank located in an area that is one standard deviation "to the right" of the mean in terms of Roman Catholic concentration is associated with a bank age of 13.9 additional months, while being a minority bank is associated with a bank age of 6.9 additional months.

Table 4.8 provides an alternative perspective to the model used in table 4.7. As stated previously, here the focus is directed to the municipality level as opposed to the bank level. The first set of regressions relate to Raiffeisen bank entry by 1904, and the second set to entry after 1904, thus separating "early" from "late" entry of banks. The reported coefficients are marginal effects calculated at the means.

With respect to the variables for hypothesis 1, relating to incumbent presence, there is some evidence of the importance of pre-existing banks. The presence of a Post Office Savings Bank branch in a municipality prior to entry is significantly positively associated with Raiffeisen bank entry in both phases, while the presence of another Raiffeisen bank is significantly negatively associated with entry in the later period

(where the variable is first included in the regressions). As such, there is some suggestion that the presence of a Post Office Savings Bank branch may have been associated with conditions favourable for the emergence of a Raiffeisen bank; they were possibly complements, with an existing Post Office Savings Bank branch perhaps conducive to an improved saving propensity, correlated with a better infrastructure, or indicative of an existing pool of savings. Contrasting with this, the negative association with the presence of another Raiffeisen bank suggests a possible competition effect, even between banks serving different religions.

Turning to hypothesis 2, which concerns banks' agricultural environment, there is some evidence that a larger percentage of horticultural land is significantly negatively associated with bank presence by 1904 (similar to the result for bank age), however it is not significant for the later entry horizon. Furthermore, there is some evidence that a greater percentage of arable land is associated with a lower entry propensity in both years. Tax value and land per farmer are statistically significant for the second horizon, perhaps indicative of the rising importance of wealth for later bank entry. Interestingly, the association is negative, suggesting Raiffeisen banks entered more depressed areas, which had a lower tax base, later in the period after entering wealthier places first.

For hypothesis 3, which concerns religion, and similar to the results for bank age, both year subcategories reveal a positive and statistically significant association between Roman Catholic concentration and the presence of a Raiffeisen bank. However, perhaps more interestingly, when only the religion variable is included in the regression the magnitude of the coefficient and the pseudo R-squared value is noticeably lower for the later entry period. This may reflect the diminishing role of

Catholicism, and the diffusion of Raiffeisen banks to all parts of rural society regardless of religion, possibly as the initial impetus provided by the Catholic clergy became less important.

Table 4.7. *Determinants of bank age*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Hypothesis 1: Market demand					
Savings bank (98)	-0.639*				0.053
	(0.367)				(0.336)
Help bank (98)	-0.535				-0.113
	(0.600)				(0.598)
Pawn bank (98)	-0.539				-0.981
	(0.783)				(0.929)
PO bank (98)	-0.099				0.377
	(0.445)				(0.432)
Hypothesis 2: Agricultural change					
Arable		0.006			-0.008
		(0.005)			(0.005)
Horticulture		-0.034**			-0.084***
		(0.015)			(0.019)
Farmers			0.057*		0.014
			(0.030)		(0.031)
Land per farmer			-0.026*		-0.009
			(0.014)		(0.014)
Tax value			6.300		8.888
			(5.704)		(5.708)
Population density			-0.227		0.116
			(0.154)		(0.186)
Hypothesis 3: Economic confessionalism					
Roman Catholic				0.024***	0.030***
				(0.003)	(0.004)
Minority bank				0.652**	0.572*
				(0.288)	(0.296)
Constant	5.960***	5.571***	5.327***	4.159***	3.843***
	(0.419)	(0.250)	(0.567)	(0.171)	(0.772)
Observations	579	579	579	579	579
R-squared	0.015	0.009	0.027	0.099	0.135

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

Table 4.8. *Determinants of early and late bank presence*

	Early entry					*Late entry*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Hypothesis 1: Market demand										
Savings bank (98/04)	-0.086**				0.027	-0.009				0.049
	(0.036)				(0.037)	(0.034)				(0.035)
Help bank (98/04)	-0.058				-0.012	0.024				0.029
	(0.077)				(0.074)	(0.061)				(0.060)
Pawn bank (98/04)	-0.038				-0.048	0.074				0.209*
	(0.111)				(0.111)	(0.095)				(0.110)
PO bank (98/04)	0.081**				0.162***	0.104**				0.165***
	(0.037)				(0.037)	(0.042)				(0.044)
Raiffeisen bank (04)						-0.139***				-0.215***
						(0.033)				(0.035)
Hypothesis 2: Agricultural change										
Arable		0.001			-0.002***		-0.0002			-0.001***
		(0.0004)			(0.001)		(0.0005)			(0.001)
Horticulture		-0.002			-0.005**		-0.0004			0.0003
		(0.002)			(0.002)		(0.002)			(0.002)
Farmers			0.007***		0.001			-0.002		-0.0001
			(0.002)		(0.002)			(0.003)		(0.003)
Land per farmer			-0.001		0.001			-0.005***		-0.004***
			(0.001)		(0.001)			(0.001)		(0.001)
Tax value			-0.868		-0.054			-1.841***		-2.171***
			(0.580)		(0.636)			(0.584)		(0.639)
Population density			-0.008		-0.013			0.002		-0.031
			(0.016)		(0.021)			(0.014)		(0.020)

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Hypothesis 3: Economic confessionalism										
Roman Catholic				0.003***	0.004***				0.001***	0.002***
				(0.0003)	(0.0004)				(0.0003)	(0.0004)
Observations	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121
Pseudo R-squared	0.011	0.003	0.024	0.111	0.151	0.020	0.0002	0.022	0.007	0.074

Notes: Probit model. Marginal effects calculated at the means. Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

4.7.2. Post-Entry Performance

We now consider whether our hypothesised reasons for the market entry of Raiffeisen banks can also explain their early performance. In table 4.9, we present the results of an OLS model regressing various measures of bank performance on the hypothesis variables and further bank-specific characteristics for 1909. Here the performance measure is first regressed on a selection of bank-specific characteristics, with a more parsimonious specification obtained by removing those variables with a t-value magnitude of less than 1. The hypothesis variables are then added stepwise to this parsimonious selection of bank characteristics, before dropping hypothesis variables in a similar manner to obtain a final parsimonious specification. It is this final specification which is reported in table 4.9. See tables 4.10–4.13 for fuller regression outputs.

We begin in column 1 of table 4.9 using return on assets (ROA) as the dependent variable. Here, among the hypothesis variables, only minority bank status shows a statistically significant association with ROA. However, the effect size is small. This limited significance of the hypothesis variables may signal that the conditions which encouraged entry are distinct from those affecting financial sustainability, or confirm that ROA was not the most important operational goal of these institutions.

Column 2 presents the results for the second measure of performance: deposit growth. A number of the hypothesis variables are statistically significant for this specification. First, the presence of a help bank or another Raiffeisen bank is negatively associated with deposit growth. The former may reflect greater poverty in an area, or the ability to acquire loans which reduces saving incentives, while the latter may reflect competition between individual Raiffeisen banks. Furthermore, the

percentage of farmers is significantly positively associated with deposit growth, suggesting that a rural clientele was favourable for increasing the pool of savings.

Column 3 presents the results for account size as the dependent variable. For the hypothesis variables, the presence of another Raiffeisen bank and minority status have a significant negative association with account size, while tax value and land per farmer have a positive association. The negative association with the presence of another Raiffeisen bank suggests a competition effect between such banks. The positive association of the dependent variable with tax value and land per farmer suggests, perhaps unsurprisingly, the presence of larger accounts in wealthier areas. Furthermore, the negative association between minority status and account size may reflect the extent of the market available to a bank given its religious status, which is possibly smaller where the bank's religious leaning aligns with the area's minority denomination.

Finally, column 4 presents the results for outreach as the dependent variable, defined as the number of deposit accounts per 1,000 people residing in a bank's municipality. For the first set of hypothesis variables, relating to incumbent presence, the significant negative associations between outreach and the presence of a savings bank, Post Office Savings Bank branch, or another Raiffeisen bank, give some support to active competitive behaviour for savings among these institution types. For the second hypothesis, the positive association with the percentage of farmers and tax value underscores the rural focus of Raiffeisen banks and perhaps the greater availability of funds in more valuable land areas. Furthermore, the extent of horticultural land has a negative association with outreach, which may reflect a reduced necessity for saving in such areas relative to other land types. However,

similar to the previous performance measures, Catholic concentration is not significant.

Table 4.9. *Bank performance*

	Financial sustainability		*Social engagement*	
	ROA	*Deposit growth*	*Account size*	*Outreach*
	(1)	*(2)*	*(3)*	*(4)*
Hypothesis 1: Market demand				
Savings bank (09)	0.079	14.843		-12.176***
	(0.081)	(9.200)		(3.255)
Help bank (09)		-87.189*		-3.007
		(48.428)		(5.174)
Pawn bank (09)		52.988	161.896	-15.195
		(52.167)	(117.477)	(10.137)
PO bank (04)				-31.138***
				(8.185)
Other Raiffeisen bank (09)		-19.804**	-28.497*	-12.304***
		(8.833)	(16.297)	(2.678)
Hypothesis 2: Agricultural change				
Arable				-0.116
				(0.074)
Horticulture			0.890	-0.676**
			(1.360)	(0.289)
Farmers		2.485**	1.407	1.898***
		(1.232)	(1.615)	(0.314)
Land per farmer			2.175*	0.207
			(1.135)	(0.179)
Tax value			701.508**	429.978***
			(351.179)	(72.331)
Population density		42.979	9.370	-1.809
		(34.628)	(24.976)	(2.446)
Hypothesis 3: Economic confessionalism				
Roman Catholic				
Minority bank	0.075*		-79.498***	
	(0.041)		(18.016)	
Control variables: Bank characteristics				
Bank age		-7.839***	-2.386	2.576***
		(1.698)	(2.770)	(0.522)
Bank size	0.020**		17.542***	3.466***
	(0.008)		(2.201)	(0.559)
Securities		-0.949**	-1.174*	-0.129
		(0.376)	(0.652)	(0.108)
Property		-1.919*	2.860**	
		(0.981)	(1.334)	
Mortgages			-3.970*	0.860
			(2.148)	(1.076)
Loans		-0.506**	-1.963***	
		(0.204)	(0.324)	
Cash			-4.110***	
			(1.495)	

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Administration	-0.014***	4.914**	-1.120***	0.016
	(0.005)	(1.921)	(0.382)	(0.053)
Reserves	0.089***	-4.328*		
	(0.032)	(2.251)		
Constant	0.165*	60.001**	436.643***	16.382
	(0.094)	(23.715)	(45.105)	(12.575)
Observations	560	516	560	560
R-squared	0.215	0.236	0.272	0.425

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

Table 4.10. *Bank performance: ROA*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Control variables: Bank characteristics							
Bank age	0.014						
	(0.014)						
Bank size	0.018***	0.022**	0.021**	0.022**	0.019**	0.020**	0.020**
	(0.006)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)
Securities	-0.001						
	(0.003)						
Property	0.014						
	(0.035)						
Mortgages	-0.001						
	(0.004)						
Loans	0.001						
	(0.002)						
Cash	-0.006						
	(0.016)						
Administration	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Reserves	0.074**	0.087***	0.088***	0.087***	0.088***	0.090***	0.089***
	(0.030)	(0.031)	(0.031)	(0.032)	(0.032)	(0.034)	(0.032)
Hypothesis 1: Market demand							
Savings bank (09)			0.091				0.079
			(0.084)				(0.081)
Help bank (09)			-0.024				
			(0.262)				
Pawn bank (09)			-0.040				
			(0.247)				
PO bank (04)			0.002				
			(0.075)				
Other Raiffeisen bank (09)			0.017				
			(0.055)				

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Hypothesis 2: Agricultural change							
Arable				-0.001			
				(0.001)			
Horticulture				-0.002			
				(0.003)			
Farmers					-0.005		
					(0.006)		
Land per farmer					-0.005		
					(0.006)		
Tax value					0.559		
					(1.072)		
Population density					-0.020		
					(0.025)		
Hypothesis 3: Economic confessionalism							
Roman Catholic						-0.0003	
						(0.001)	
Minority bank						0.078**	0.075*
						(0.039)	(0.041)
Constant	0.147	0.196**	0.172*	0.224**	0.297*	0.200*	0.165*
	(0.134)	(0.092)	(0.097)	(0.111)	(0.166)	(0.118)	(0.094)
Observations	560	560	560	560	560	560	560
R-squared	0.220	0.211	0.213	0.211	0.214	0.213	0.215

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

Table 4.11. *Bank performance: Deposit growth*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Control variables: Bank characteristics							
Bank age	-6.619***	-6.964***	-7.278***	-6.984***	-7.243***	-6.740***	-7.839***
	(1.532)	(1.584)	(1.618)	(1.568)	(1.612)	(1.522)	(1.698)
Bank size	-0.762						
	(0.786)						
Securities	-0.802**	-0.765**	-0.760**	-0.791**	-0.903**	-0.699***	-0.949**
	(0.334)	(0.315)	(0.323)	(0.320)	(0.373)	(0.264)	(0.376)
Property	-1.454	-1.539	-1.673*	-1.566	-1.680*	-1.535	-1.919*
	(1.001)	(0.960)	(1.011)	(0.963)	(0.920)	(0.997)	(0.981)
Mortgages	-0.276						
	(0.551)						
Loans	-0.476**	-0.451**	-0.426**	-0.456**	-0.513**	-0.434**	-0.506**
	(0.226)	(0.207)	(0.211)	(0.206)	(0.209)	(0.202)	(0.204)
Cash	0.113						
	(1.093)						
Administration	4.669**	4.801**	4.872**	4.854**	4.912**	4.720**	4.914**
	(2.273)	(2.172)	(2.026)	(2.206)	(2.035)	(2.223)	(1.921)
Reserves	-4.015*	-4.251*	-4.404*	-4.252**	-4.410**	-4.163*	-4.328*
	(2.146)	(2.166)	(2.380)	(2.153)	(2.158)	(2.193)	(2.251)
Hypothesis 1: Market demand							
Savings bank (09)			14.164				14.843
			(11.593)				(9.200)
Help bank (09)			-90.996				-87.189*
			(57.618)				(48.428)
Pawn bank (09)			164.027				52.988
			(135.003)				(52.167)
PO bank (04)			0.608				
			(10.961)				
Other Raiffeisen bank (09)			-20.452**				-19.804**
			(8.905)				(8.833)

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Hypothesis 2: Agricultural change							
Arable				0.074			
				(0.113)			
Horticulture				0.278			
				(0.655)			
Farmers					2.895**		2.485**
					(1.401)		(1.232)
Land per farmer					0.478		
					(0.535)		
Tax value					-42.952		
					(198.233)		
Population density					43.418		42.979
					(36.238)		(34.628)
Hypothesis 3: Economic confessionalism							
Roman Catholic						-0.074	
						(0.100)	
Minority bank						-0.611	
						(12.977)	
Constant	81.639***	78.195***	82.759***	73.993**	40.949	80.715***	60.001**
	(28.068)	(25.793)	(23.901)	(28.932)	(29.487)	(27.773)	(23.715)
Observations	516	516	516	516	516	516	516
R-squared	0.143	0.143	0.187	0.143	0.209	0.143	0.236

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

Table 4.12. *Bank performance: Account size*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Control variables: Bank characteristics							
Bank age	-3.832	-4.190	-3.576	-3.714	-3.514	-3.591	-2.386
	(2.802)	(2.623)	(2.660)	(2.777)	(2.679)	(2.604)	(2.770)
Bank size	17.398***	17.388***	17.169***	16.957***	17.120***	18.273***	17.542***
	(2.219)	(2.218)	(2.119)	(2.315)	(2.235)	(2.248)	(2.201)
Securities	-1.406**	-1.442**	-1.234*	-1.394**	-0.953	-1.800***	-1.174*
	(0.669)	(0.664)	(0.659)	(0.654)	(0.654)	(0.643)	(0.652)
Property	3.038**	2.975**	2.982**	2.956**	3.254**	2.493*	2.860**
	(1.360)	(1.344)	(1.175)	(1.403)	(1.307)	(1.420)	(1.334)
Mortgages	-3.697*	-3.733*	-3.691	-3.835*	-3.408	-4.091*	-3.970*
	(2.161)	(2.173)	(2.268)	(2.101)	(2.170)	(2.139)	(2.148)
Loans	-2.060***	-2.072***	-2.109***	-2.095***	-2.042***	-1.991***	-1.963***
	(0.352)	(0.346)	(0.349)	(0.342)	(0.333)	(0.335)	(0.324)
Cash	-4.413***	-4.403***	-4.130***	-4.228***	-4.243***	-4.434***	-4.110***
	(1.505)	(1.504)	(1.458)	(1.510)	(1.503)	(1.484)	(1.495)
Administration	-1.218***	-1.217***	-1.102***	-1.249***	-1.220***	-1.218***	-1.120***
	(0.374)	(0.374)	(0.376)	(0.381)	(0.392)	(0.371)	(0.382)
Reserves	-1.429						
	(2.898)						
Hypothesis 1: Market demand							
Savings bank (09)			18.476				
			(18.727)				
Help bank (09)			24.173				
			(70.376)				
Pawn bank (09)			188.350**				161.896
			(83.902)				(117.477)
PO bank (04)			19.147				
			(25.969)				
Other Raiffeisen bank (09)			-42.344**				-28.497*
			(16.634)				(16.297)

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Hypothesis 2: Agricultural change							
Arable				0.018			
				(0.294)			
Horticulture				1.613			0.890
				(1.276)			(1.360)
Farmers					2.109		1.407
					(1.620)		(1.615)
Land per farmer					2.114*		2.175*
					(1.127)		(1.135)
Tax value					598.462*		701.508**
					(355.909)		(351.179)
Population density					33.753**		9.370
					(16.051)		(24.976)
Hypothesis 3: Economic confessionalism							
Roman Catholic						-0.009	
						(0.211)	
Minority bank						-73.715***	-79.498***
						(16.240)	(18.016)
Constant	509.795***	510.728***	492.754***	503.168***	422.578***	517.555***	436.643***
	(29.831)	(29.578)	(35.785)	(34.271)	(42.139)	(31.464)	(45.105)
Observations	560	560	560	560	560	560	560
R-squared	0.208	0.208	0.243	0.210	0.236	0.228	0.272

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

Table 4.13. *Bank performance: Outreach*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Control variables: Bank characteristics							
Bank age	3.513***	3.557***	3.056***	3.568***	2.881***	3.365***	2.576***
	(0.630)	(0.573)	(0.549)	(0.573)	(0.542)	(0.610)	(0.522)
Bank size	2.844***	2.859***	3.398***	2.885***	2.911***	2.920***	3.466***
	(0.609)	(0.612)	(0.598)	(0.602)	(0.589)	(0.632)	(0.559)
Securities	-0.272**	-0.219*	-0.299**	-0.175	-0.076	-0.266*	-0.129
	(0.135)	(0.133)	(0.120)	(0.133)	(0.120)	(0.142)	(0.108)
Property	-0.431						
	(0.589)						
Mortgages	1.395	1.418	0.823	1.489	1.295	1.379	0.860
	(1.294)	(1.256)	(1.106)	(1.235)	(1.230)	(1.287)	(1.076)
Loans	-0.043						
	(0.067)						
Cash	-0.039						
	(0.218)						
Administration	-0.064	-0.073*	-0.038	-0.051	-0.015	-0.084**	0.016
	(0.042)	(0.041)	(0.051)	(0.042)	(0.037)	(0.041)	(0.053)
Reserves	0.599						
	(0.764)						
Hypothesis 1: Market demand							
Savings bank (09)			-10.603***				-12.176***
			(3.464)				(3.255)
Help bank (09)			-10.983**				-3.007
			(4.407)				(5.174)
Pawn bank (09)			-15.610***				-15.195
			(5.711)				(10.137)
PO bank (04)			-34.910***				-31.138***
			(7.709)				(8.185)
Other Raiffeisen bank (09)			-14.915***				-12.304***
			(2.853)				(2.678)

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Hypothesis 2: Agricultural change							
Arable				-0.135*			-0.116
				(0.074)			(0.074)
Horticulture				-0.405*			-0.676**
				(0.223)			(0.289)
Farmers					2.581***		1.898***
					(0.320)		(0.314)
Land per farmer					0.441**		0.207
					(0.207)		(0.179)
Tax value					553.709***		429.978***
					(75.188)		(72.331)
Population density					-7.849***		-1.809
					(1.908)		(2.446)
Hypothesis 3: Economic confessionalism							
Roman Catholic						0.050	
						(0.053)	
Minority bank						-1.411	
						(3.845)	
Constant	10.326***	7.982**	48.978***	14.808***	-39.702***	6.521	16.382
	(3.908)	(3.320)	(8.039)	(4.704)	(7.440)	(3.965)	(12.575)
Observations	560	560	560	560	560	560	560
R-squared	0.220	0.218	0.337	0.228	0.349	0.220	0.425

Notes: OLS model. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Variable definitions in table 4.5.

Sources: See table 4.5.

4.8. Conclusion

Overall, our results suggest a nuanced narrative for the entry and early performance of Raiffeisen banks in the Netherlands at the turn of the twentieth century. In the beginning, it appears that Catholicism provided the necessary impetus for bank emergence, albeit in an environment with important, but perhaps insufficient, economic rationales for market entry. Thereafter, however, the role of religion was to provide religiously-homogenous bank networks, both Catholic and Protestant, and thus to enable the cooperative organisational form to succeed throughout pillarised Dutch society. As such, it was wider economic factors beyond religious affiliation which became more pertinent for the variation in post-entry performance.

Establishing a single-factor explanation for the arrival of Raiffeisen banks is difficult, and may oversimplify a more complex reality. Yet, an increase in the societal role of religion appears to coincide closely with the market entry of the Raiffeisen banks—possibly more definitively than the agricultural crisis and related concerns about a lack of agricultural credit. Indeed, the Catholic clergy, motivated by *Rerum Novarum*, perhaps played an important role in endorsing and promoting cooperative banks to adherents of Catholicism, with religious identity also becoming particularly relevant due to the pillarisation of Dutch society. As such, while economic conditions may have justified new banking innovation, changes "within religion"—particularly the broader societal mandate of the Church, and inspiration from *Rerum Novarum*—were possibly more pivotal in facilitating the diffusion of cooperatives. Future inquiry may wish to establish more exactly the role of *Rerum Novarum* in the development of cooperative banking, with other scholars already recognising its relevance in the Netherlands (Colvin and McLaughlin, 2014; Mooij, 2016). Nevertheless, it is perhaps

this rising importance of religion, and its associated network of adherents, which had particular relevance in the emergence and diffusion of the Raiffeisen banks.

4.9. Appendix: Overview of Institution Characteristics

4.9.1. The Market for Savings

At the turn of the twentieth century, Dutch household savings services were delivered by three main market players: savings banks (*spaarbanken*), the Post Office Savings Bank (Rijkspostspaarbank), and more latterly Raiffeisen banks (*boerenleenbanken*). Savings banks had been the sole incumbent throughout most of the nineteenth century, but this changed in the 1880s with the arrival of the Post Office Savings Bank, which attached on to the existing post office network, and again in the 1890s with the arrival of Raiffeisen banks, which specifically targeted a more rural clientele.

Table 4.14 displays the attributes of the various bank types. This shows that, unlike the savings banks, which tended to be organised as societies, the Post Office Savings Bank was established at the state level, while Raiffeisen banks followed Raiffeisen principles, and took either the society or the cooperative organisational form. Savings banks also tended to set up in more urban settings, while Raiffeisen banks, which originally had been targeted at agriculturalists, tended to establish in rural settings. The Post Office Savings Bank, by attaching on to the existing post office framework, enjoyed national scope. Savings banks also tended to be much more unit-independent than either of their counterparts; the Post Office Savings Bank was organised into a network of offices across the country, while Raiffeisen banks were affiliated according to their religious identity into networks headed by central banks in either Alkmaar, Eindhoven, or Utrecht. Interestingly, however, savings banks were not

entirely decentralised, with a significant proportion affiliated to the Maatschappij tot Nut van 't Algemeen (friendly society), and then from 1907 a number became affiliated to a new savings-bank union. Savings banks also held a more complex set of investments than either of their counterparts—perhaps indicative of their more sophisticated status; the Post Office Savings Bank invested heavily in government securities, while Raiffeisen banks relied on loans to their members.

4.9.2. The Market for Loans

Similar to its savings counterpart, the market for loans experienced something of an evolution throughout the nineteenth century. However, unlike savings institutions, for which there was not an obvious informal alternative, loan institutions had to compete with a variety of incumbent, private credit providers such as *kassiers*. Nevertheless, by the turn of the twentieth century, at least three main players existed in the market providing formal household-credit services: Raiffeisen banks, pawn banks (*banken van leening*), and help banks (*hulpbanken*). The pawn banks, which had existed throughout the nineteenth century, mainly dealt with thousands of low-value pawns, with individuals pawning everything from winter clothing to jewellery (Jansen, 1964). Help banks, by contrast, emerged in the mid-nineteenth century, and focused on poverty alleviation through the provision of small loans.[50] More latterly, Raiffeisen banks emerged in the 1890s with a particular emphasis on reaching a rural clientele, and fulfilling a dual savings-loans function following Raiffeisen principles.

Similar to the savings institutions, loan institutions also differed in their attributes, which are conveyed in table 4.15. A number of important differences

[50] Reliant on donations and sale of shares to raise capital, help banks were a relatively diverse set of institutions—with some charging interest on loans and some paying a dividend (Jacobs, 2005). Some help banks also had a savings-bank function.

emerge. First, both help banks and pawn banks were relatively independent, and tended to establish themselves in urban locations, unlike the Raiffeisen banks, which had a specific rural focus and were connected within a federated network. Raiffeisen banks also differed in that they did not sell valuable shares and gained capital instead from deposits from their members, who were liable to an unlimited amount. Meanwhile, help banks relied on shares and charity, and pawn banks on pawns and charity. Also, unlike their counterparts, pawn banks were linked to the municipal system in which they were located, with this system fulfilling an oversight function. One common feature shared by all institution types was their reliance on credit provision as their main investment strategy.

As alluded to already, in addition to the institutions examined here, loans could be obtained from a variety of other sources, many informal in nature. Store credit was popular in urban and rural centres alike. Mortgages could be arranged directly through notaries, who acted as financial intermediaries. And private pawn shops operated in urban centres, on the fringes of the law.

Table 4.14. *Attributes of savings institutions*

	Savings banks	*Post Office Savings Bank*	*Raiffeisen banks*
Enterprise form	Society, some others	State	Society or coop
Scale/coverage	Local (urban)	National	Local (rural)
Liability/guarantee	Unlimited	State guarantee	Unlimited
Source of capital	Deposits	Deposits	Deposits
Unit independence	Yes	No	Yes, but federated
Federations	Some	Not applicable	Yes, by religion
Investment portfolio	Government securities, mortgages	Government securities	Loans to members

Source: Own research, based on the schema used in Hollis and Sweetman (1998), Guinnane (2011), and Colvin and McLaughlin (2014).

Table 4.15. *Attributes of loan institutions*

	Help banks	*Pawn banks*	*Raiffeisen banks*
Enterprise form	Society, some others	Municipal / society	Society or coop
Scale/coverage	Local (urban)	Local (urban)	Local (rural)
Liability/guarantee	Limited?	Municipal oversight	Unlimited
Source of capital	Charity, shares	Charity, pawns	Deposits
Unit independence	Yes	Yes	Yes, but federated
Federations	No	No	Yes, by religion
Investment portfolio	Loans	Pawns	Loans to members

Source: Own research, based on the schema used in Hollis and Sweetman (1998), Guinnane (2011), and Colvin and McLaughlin (2014).

5. Conclusion

This thesis adds to an existing literature which has sought to evaluate the role of religion in historical economic and financial development. Traceable to at least the work of Max Weber at the start of the twentieth century, this body of research has provided an increasingly nuanced and quantitatively-informed perspective on a possible cultural channel for global and more local development. The focus of the present thesis has been on Ireland and the Netherlands for a period which straddles the emergence of Weber's seminal work. These polities provide particularly interesting laboratories for such inquiry due to the lack of existing scholarship focused thereon, and also due to the unique, but central, role religion played in their social and economic history.

The findings of all three major chapters point to the role of religion in both the Irish and Dutch cases. In chapter 2, the results suggest a denominational convergence in post-Famine Ireland, with a narrative of "Catholic embourgeoisement" advanced to explain the historical amelioration of religious differences. In chapter 3, the use of individual-level data from the 1911 Irish census reveals a sizeable human capital gap between Catholics and Protestants, which is robust to a variety of econometric specifications. As such, while religious disadvantage may have dissipated in the decades following the Famine, Catholics still lagged in human capital terms even after controlling for obvious socioeconomic differences. Finally, in chapter 4, the results suggest that the function played by religion in Dutch financial development may have varied over time. In particular, Catholicism appears to be a significant driver for the emergence of financial cooperatives, but thereafter religious differences matter less, perhaps indicative of the general importance of religion, whether Catholic or

Protestant, in facilitating the success of the cooperative organisational form.

In the Irish case, these results offer a fresh perspective on the role of religion in Irish development adding to previous scholarship such as Kennedy (1978), Akenson (1988), and O'Rourke (2007), who have also considered the significance of religion. The perspective offered here expands on previous inquiry by looking across a variety of development indicators for the post-Famine period, as well as focusing more precisely on human capital differences through the use of individual-level data. In the Dutch case, these findings add to scholarship which has pointed to a possible religious rationale for the emergence of Raiffeisen banks (Jonker, 1988), as well as to work which has dealt with the significance of pillarisation for cooperative banking (Colvin and McLaughlin, 2014).

The findings of this thesis are also significant in at least three respects beyond their contribution to the historical narrative for particular regions. First, they underscore the importance of time when considering the association between religion and development. As chapter 2 revealed, focusing on a single observation point may yield a potentially restricted view, and miss important changes over a wider horizon. Second, the results suggest that individual-level data may provide a fruitful channel to deal with ecological fallacy concerns, and also to provide insights not realised from using aggregate-level data. Indeed, as shown in chapter 3, there was a sizeable human capital gap between Catholics and Protestants in early twentieth-century Ireland, even after controlling for a range of other possible contributory factors. Finally, the results of this research suggest that religion may be important in a variety of respects, such as for human capital, occupation, and finance, thereby adding to other scholarly inquiry which has also suggested a range of possible pathways through which religion may

manifest.

Overall, as illustrated in recent survey articles by Becker et al. (2016) and Iyer (2016), research on the relationship between religion and economy continues to be an attractive prospect for academic inquiry in the social sciences. In the future, several lines of inquiry are particularly promising for advancing further the frontiers of our knowledge in both the Irish and Dutch cases. For Ireland, a natural extension of the present thesis would be to explore the relationship between religion and development in Ireland after independence, particularly the status of Protestantism in the new "Catholic" state. For the Netherlands, future inquiry may wish to establish the impact of pillarisation for economic and financial development more broadly. In addition, the methodology employed in chapter 4 may benefit from further consideration of autocorrelation issues relating to time and space. For example, did priests copy the actions of others residing nearby? Furthermore, the obvious analogies between the Irish and Dutch cases surely merit inquiry which exploits the similarities and differences between the countries to consider the economic role of religion in a comparative framework.

Indeed, before closing, it would be remiss of this thesis not to give some initial consideration to the societal significance of religion in the two country situations. This is especially true given that for the latter half of the nineteenth century and in the first few decades of the twentieth century—the period on which this thesis focuses—religion in both polities was not merely an expression of faith, but was instead indicative of a much wider "cultural" identity. Moreover, despite the integral role played by religion in both societies, their experiences were very different. In the Netherlands, differing religious and ideological identities manifested in distinct pillars

with their own schools, political parties, newspapers, and trade unions, but where a politically-compromising situation prevailed. By contrast, in Ireland, religious divisions were less successfully channelled into harmonious accommodation, and ultimately the island partitioned into separate religiously-associated entities.

Providing a comprehensive comparison of the Dutch and Irish cases is beyond the scope of this thesis, but nevertheless it is at least possible to speculate on the reasons for their contrasting pathways. Perhaps a useful starting point in this respect is the recent work of Rubin (2017), which attempts to explain the different economic trajectories of Western Europe and the Middle East, as linked to Christianity and Islam. Rubin suggests that the Middle East stagnated as Islamic religion was particularly important in legitimizing Muslim rule. This is because Islamic religion formed alongside the expansion of the early Islamic empires, and was closely linked to their evolving legal and political institutions. As a result, religious elites—legitimizing agents—had a particularly important role in securing the position of Muslim rulers in the Middle East. Hence rulers were less likely to change their policies or rules in ways that would undermine the position of the legitimizing elite.

Initially, such arguments seem somewhat removed from the Dutch and Irish cases. However, on further reflection, the notions of legitimacy and power provide an appealing framework to begin thinking about the contrasting experiences of religion in Ireland and the Netherlands. Consider first the Dutch case, where from the latter half of the nineteenth century there was greater enfranchisement and moves towards "mass politics". In this democratizing transition, Wintle (2000, p. 255) notes how, after constitutional reform in 1848, 'the whole concept of the legitimacy of power switched from an aristocratic-monarchical one to a liberal-democratic one'. Indeed, the electoral

power of the Liberals—artificially inflated by voting limitations—fell as more of the population became enfranchised (Andeweg and Irwin, 2009, p. 25). As a result, the opportunities for religious groups to exert political control were possibly increased. However, Catholics, perhaps due to the historical discrimination they faced, were slow at forming a political party (Andeweg and Irwin, 2009, p. 25). In the language of Rubin (2017), then, adherents of the various denominations and their religious leaders potentially had a greater legitimizing role as political power was now more equitably distributed throughout society. Indeed, Van Zanden (1998, pp. 10–11) suggests that two positions posited for the pillarization of Dutch society are the emancipation of the lower classes and an effort to gain control in the changing political domain, while Wintle (2000) suggests that pillarization was perhaps a response to secularization. As such, although there may be debate on the precise reasons for pillarization, again a possible link between religion and societal power emerges, with religious elites perhaps motivated to extend their religious influence beyond strictly religion due to the potential political benefits they accrue from the group identity of their co-religionists.

Ireland's path, although different, still resonates with the Dutch case. For just as in the Netherlands where a new political consciousness and social equality arose, so too in Ireland popular politics and the erosion of an old elite—in this case Anglican—stratum occurred. However, Ireland differed from the Netherlands in that rising social equality led to separatist ideology, not compromise within the existing framework. Nevertheless, the legitimizing role of religion is effectively conveyed in the Catholic Church's power alliance with Irish nationalism. Indeed, Larkin (1975) recognises the legitimizing role of the Church in generating political capital for nationalism, and the role of the alliance in securing the power of the Church by making nationalism

"accountable". The symbiotic relationship may also explain to some extent the remarkable persistence of religiosity in Ireland into the twentieth century, with the Church possibly playing an important legitimizing role in politics and society. However, more recent scandals associated with the Catholic Church and increasing secularisation (which are likely not independent) may also explain an apparent reversal in the power of religion in Irish society, which is possibly linked to a weaker legitimizing capability.

Yet, the question still remains: why did Ireland follow a more separatist trajectory? Here, one may speculate that an important factor was the clear numerical advantage enjoyed by Roman Catholics. In Ireland, Roman Catholics made up a significant majority of the population, whereas this was not the case in the Netherlands. As such, Irish Catholics had good reason to recognise themselves as socially oppressed in an island where the elite was dominated by Protestants—the minority. Indeed, even if more equitable status could be achieved, the religious identity shared by Roman Catholics meant that they had a powerful common bond, which when combined with a history of inequality with their Protestant neighbours, gave them a clear rationale for dissatisfaction with the prevailing societal framework. As a result of this, Irish Roman Catholics had a common legitimizing identity which could be potentially harnessed in their struggle for greater societal power. In the Netherlands, however, the lack of such a religious majority, meant that different ideological strands of the population had greater reason to yield to a more harmonious settlement. Indeed, by forming distinct pillars, each part of the population was arguably able to enjoy its own separate, but more utopian, version of society.

Future research may attempt to explore the political and economic significance

of religion more closely in the Dutch and Irish contexts. Here, some initial speculation has been offered on the ability of religion to generate social capital in society and how this may be fruitful to the legitimization of political actors. Nevertheless, a deeper understanding of the implications of religion for political legitimacy in the Dutch and Irish cases is a promising avenue for future inquiry, and may shed further light on the causal connections underpinning the relationship between religion and economy.

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